GE Fanuc Automation

Programmable Control Products

PANELWARE™ MMI

Application Manual for GE Fanuc Series 90 Protocol (SNP)

GFK - 0850A *May 1995*

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This manual provides a quick guide to installing and operating PANELWARE™ panels, describes the respective configuration techniques, and outlines general use of the PANELWARE Configuration Software (PCS) with GE Fanuc Series Ninety Protocol (SNP).

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Revisions to this Manual

Changes made to this manual reflect the added features of release 1.8 (May 1995) of PANELWARE Configuration Software (refer to the most recent revision of the *PANELWARE Configuration Software Reference Manual* — GFK-0849 for details). Additionally, corrections have been made where necessary. The following list describes the major revisions in this manual, as compared to the previous version (GFK-0850):

- An expanded discussion of setting Protocol Parameters to configure communication between the PANELWARE Panel and a PLC (see "Protocol Parameters" in Chapter 3)
- Cabling for communication between the PLC and the Panel using RS-232 and RS-422 interfaces, as well as RS-485 (see "Connecting the PLC and the Panel" in Chapter 2, "Configuration of the PLC Interface" in Chapter 3, and Appendix A)
- Cabling for a four-wire multidrop configuration using up to eight PLCs (see Appendix A).

Content of This Manual

Chapter 1. Overview provides a short description of the PCS and outlines the prerequisites for PCS operation with the PC and the PLC.

Chapter 2. Quick Start provides installation instructions and introduces the operation and functionality of the PCS by means of several easy-to-follow examples.

Chapter 3. Configuring Communication with the PLC contains information on panel controller and PLC interface configurations and describes how to make the connection between the panel and PLC.

Chapter 4. Connection Editor describes the PCS function that performs the organization of variables in the panel (symbolic names) and addresses in the PLC.

Chapter 5. Demo Project briefly explains how to run the demo projects that are delivered with the software.

Appendix A. Cabling Information describes the required PCS-to-PLC and PC interface cables and provides several cabling diagrams.

Appendix B. Errors / Troubleshooting provides an overview of possible system errors and explains their causes and possible solutions.

Related Publications

GFK-0848 ***PANELWARE™ Hardware Installation User's Manual***
This manual describes the PANELWARE Operator Panels and contains technical data, hardware installation instructions and the general information required for putting the panels into operation.

GFK-0849 ***PANELWARE™ Configuration Software Reference Manual***
This manual describes the PCS and provides the program setups for panels that are equipped with a programmable controller.

GFK-0582 ***Series 90 PLC Serial Communications User's Manual***
This manual describes serial communications products for the Series 90 Programmable Logic Controller (PLC). Information is provided to implement a serial communications link between the Series 90 PLC, a host computer, peripheral device, or another PLC.

GFK-1112 ***PANELWARE™ Application Manual for Siemens SINEC L1 Driver***
Contains specific information on the configuration of PANELWARE Panels that communicate with Siemens controllers by means of the SINEC L1 protocol.

GFK-1113 ***PANELWARE™ Application Manual for the Modicon MODBUS (RTU/ASCII) Driver***
Contains specific information on the configuration of PANELWARE Panels that communicate with MODICON controllers by means of the MODBUS protocol.

GFK-1142 ***PANELWARE™ Configuration Software Quick Start Guide***
This guide, a companion to the *PANELWARE Configuration Software Reference Manual* (GFK-0849), provides basic information for configuring and using PCS. Includes an example project.

We Welcome Your Comments and Suggestions

At GE Fanuc Automation, we strive to produce quality technical documentation. After you have used this manual, please take a few moments to complete and return the Reader's Comment Card located on the next page.

Libby Allen
Senior Technical Writer

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Chapter 1 Overview

This chapter provides an overview of PCS and outlines the requirements for PCS operation with a PC and PLC. It includes the following information:

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PANELWARE Configuration Software (PCS)

PANELWARE Configuration Software (PCS) allows complex projects to be created by using easy-to-follow, menu-controlled instructions. These projects are actually programs that are transferred to a Panel and started there via a Panel power-on or Reset. PCS-created Panel program (project) then takes over communication with the PLC and performs the following:

- Reads data from the PLC and displays it on the screen in the specified format (values, text, bar-graphs, graphics)
- Writes data to the PLC and executes PLC functions
- Displays static data such as text masks and lines

Using PCS, projects can be created for the C200 Panel Controller.

Every project consists of at least the following components:

Table 1 - 1. PCS Project Component Descriptions

Project Component	Definition
Project Definition	Consists mainly of the hardware configuration of the Panel and the picture directory.
Picture Directory	A list of all pictures used in the project; also contains information on switching to other pictures. A picture change (making a different picture appear on the screen) can be performed either by pressing a defined key or via the direction of the PLC.
Pictures	Contains all information about what is to be displayed on the display module. Text, in/output fields, and on graphics-capable displays, lines, and bars, can all be components of a picture.
Keyboard Definition	Defines the keyboard function assignments (function keys, numeric, or alphanumeric keys can be defined as the user desires).
Connection List	Lists all connections that the Panel can access. A connection defines the type of connection (protocol), the interface, and the location where the Panel can find the data (e.g., which CPU in a network).

Hardware and Software Requirements

PCS is delivered in two formats—a single 5 1/4" HD (1.2M) diskette and two 3 1/2" DD (720 KB) diskettes. The diskette(s) you use to install PCS depends on your PC configuration.

Before installing the software, ensure that the PC on which PCS will be installed meets the following requirements:

- Complete IBM PC compatibility (80286 processor or higher)
- IBM-compatible monochrome or color monitor/adapter
- One 3½" (720 KB) or 5 1/4" (1.2 MB) floppy disk drive
- At least 3 MB free hard disk space—2 MB for the installation, 1 MB for PCS operation
- 640 KB RAM, of which at least 512 KB must be available. Memory-resident programs should be removed if necessary to free up the RAM.
- Minimum 1 serial interface (COM1 or COM2)
- MS-DOS version 3.30 or higher
- The CONFIG.SYS file settings for FILES and BUFFERS must be set to a minimum of: FILES=40; BUFFERS=10.

Note

PCS may be executed in a DOS box under Windows 3.1 *only* in offline mode. To either download or upload a project to/from a Panel, you must exit Windows and run PCS from the DOS prompt.

PLC Requirements

In order for PCS to function with the PLC, the PLC must meet the following requirements:

- Series 90-30 or 90-70 PLC
- For connection to a Panel, a free RS-422 or RS-232 interface supporting the SNP protocol is required

Document Conventions

Key Symbols

All keys used to operate PCS are shown in bold in this manual:

Table 1 - 2. Key Symbols

Key		Description
German	**English**	
↑	↑	Cursor up
↓	↓	Cursor down
←	←	Cursor left
→	→	Cursor right
↵	↵	Enter (Return)
Bild↑	**PgUp**	Cursor one page up
Bild↓	**PgDn**	Cursor one page down
Einfg	**Ins**	Switches between insert and overwrite modes
Entf	**Del**	The character in the cursor position is deleted
Esc	**Esc**	Exits from the current function; exits the editor or a menu
Space	**Space**	Space (Blank character)
Strg	**Ctrl**	Control key
Shift	**Shift**	SHIFT key
Alt	**Alt**	Alternate key
⇐	⇐	The character to the left of the cursor position is deleted (Back Space)

If two keys are to be pressed simultaneously to execute a function, the keys will be connected by the plus (+) character. Example: **`Ctrl+Ins`**

Text that is to be entered directly using the keyboard is shown in **bold** and ***italic***.

Example: ***`panel`***

Menu Functions

The names of pull-down menus and menu functions are shown in bold. Variable functions for function keys are also shown in bold. Examples:

F10 Exit
Edit menu

Chapter 2 Quick Start

This chapter provides a quick-start guide to installing and using PCS and, using easy-to-follow steps, explains how to create a project. It includes the following information:

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Section 1 Software Installation

PCS is delivered on two 3½-inch disks in 2DD (720K) format and on one 5¼-inch disk in 2S/HD (1.2M) format. All drivers used for communication with GE Fanuc PLCs are included on the disks.

Description	Catalog Number
PANELWARE Configuration Software (includes cable assembly)	IC641SWP950

Before starting the software installation, make sure the following requirements are met:

- Complete IBM PC compatibility (processor types: 80286 and higher)
- IBM compatible monochrome or color adapter
- One 3½ inch (720 Kbyte) or 5¼ inch (1.2 Mbyte) floppy disk drive
- For the installation, approximately 3 Mbytes must be free on the hard disk.
- 640 KB RAM, of which at least 512 KB must be available. Memory-resident programs should be removed if necessary to free up the RAM.
- Minimum 1 serial interface (COM1 or COM2)
- MS-DOS version 3.30 or higher
- The CONFIG.SYS file settings for FILES and BUFFERS must be set to a minimum of: FILES=40; BUFFERS=10.

Calling the Setup Program

Insert PCS distribution diskette into the appropriate floppy disk drive. If you are using the two 3 1/2" diskettes, install the #1 disk first (the system will prompt you when it is time to insert disk #2).

Depending on the floppy drive designation (a or b), type one of the following commands at the DOS prompt, then press the ↵ (Enter) key:

```
C:\>a:setup
```

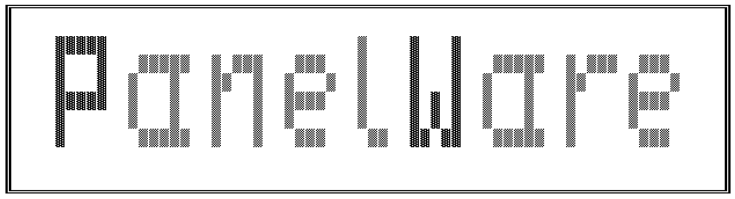
or

```
C:\>b:setup
```

After you press ↵, the setup program is called and the menu for language selection appears on the screen.

Language Selection

The **Language Selection** menu is used to select the language (English or German/Deutsch) in which you configure PCS during the installation procedure. This language is used as the default selection for PCS.




```
SPRACHENAUSWAHL                    LANGUAGE SELECTION

 F1 : DEUTSCH                       F2 : ENGLISH
 F3 :                               F4 :
 F5 :                               F6 :
 F7 : HILFE - HELP                  F8 : DOS

Bitte wählen sie aus               Please select
```

Press the function key that corresponds to the desired language. When it has been selected, the **Install Program** menu is displayed on the screen.

Installation Menu

All system information that the software requires—the computer type/specifications used and the source and destination paths of the software—is entered or displayed in the **Install Program** menu. Computer type, DOS version, source path and memory size are entered automatically. You must enter the destination path.

```
        P A N E L W A R E      Driver Install Program
                             PANELWARE

         Source path      : A:\
         Destination path : C:\PW\
         Computer Type    : 386 - COMPUTER
         MS-DOS Version   : 6.20
         Memory Size (kB) : 640


S E L E C T  --->  F1 to F8

F1 : Change destination path       F2 :
F3 : Install                       F4 : Remarks
F5 :                               F6 :
F7 : HELP                          F8 : EXIT

 SELECT
```

From the **Install Program** menu, you can change destination paths, start the installation, configure the screen, and exit the installation.

Function Keys

F1 Change destination path ..... Changes the path and directory in which PCS will be installed

F3 Install ..... Starts the PCS installation

F4 Remarks ..... Brings notes pertaining to requirements for the installation onto the screen.

F5 Screen configuration ..... After the installation is finished, you can use this function to change the screen configuration.

F7 HELP ..... This displays a short description of the function keys and their functions.

F8 EXIT ..... The Setup program is ended.

Changing the Destination Path

The destination path (the directory in which the software is to be installed) is set to **C:\PW** by default. By pressing **F1 Change destination path**, you can specify a different disk drive and/or path into which PCS will be installed.

Start Installation

Once the system information is correct in the **Install Program** menu, start the installation process by pressing **F3 Install**.

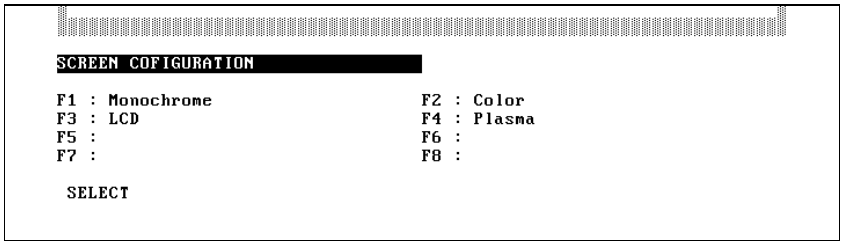
The setup program may recommend changes to the **CONFIG.SYS** file. These changes are only made if you confirm them at the prompt.

Caution

PCS requires the minimum values recommended for *FILES* and *BUFFERS*. If you enter smaller values in the *CONFIG.SYS* file, problems could arise while running PCS.

Screen Configuration

The **Screen Configuration** menu is displayed once the CONFIG.SYS file changes are made.



This screen allows you to set up the appropriate PCS screen type by pressing the function key that corresponds to your computer's display. When you select a display type, the system begins copying PCS files to the destination directory you selected.

After all PCS installation files are copied to the destination directory, the following message is displayed:

```
Installation completed. Press any key to continue _
```

The **Install Program** menu reappears on the screen when any key is pressed.

Note

If the screen type that was selected during installation must be changed after installation, you can access the **Screen Configuration** menu again by pressing **F5 Screen configuration** from the **Install Program** menu and selecting the desired screen type.

Exiting the Installation

The setup (installation) program is exited when you press **F8 EXIT** from any of the menus. Before exiting, the following message will appear on the screen if changes were made to the CONFIG.SYS file:

```
System file modified: RE-BOOT (Y/N)?
```

To start PCS properly, it is necessary to reboot the computer after installation when changes have been made to the CONFIG.SYS file.

Remove the distribution diskette from the floppy drive and press ***Y*** to reboot the computer in order to put the changes to the **CONFIG.SYS** file into immediate effect. If you do not remove the diskette from the floppy drive, the system will reboot from the floppy drive rather than the hard drive.

Caution

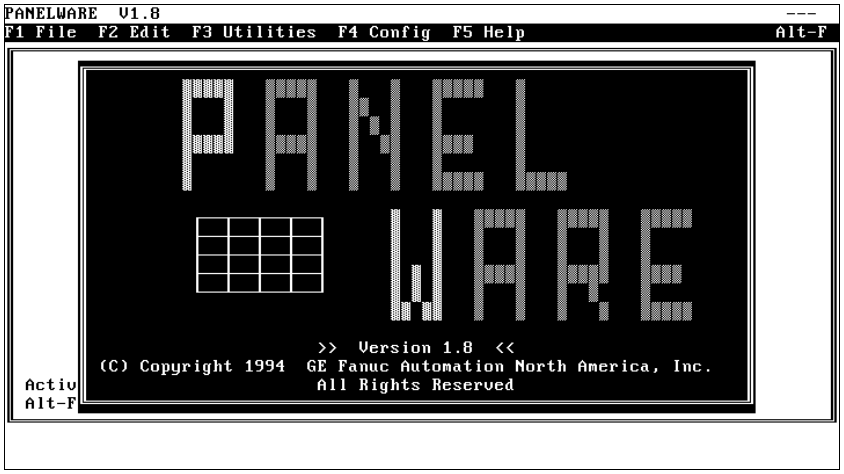
During the installation process, a batch file called PANEL.BAT is created in the root directory of your hard disk. This file should never be deleted, as it is used to access PCS.

Section 2 Starting PCS

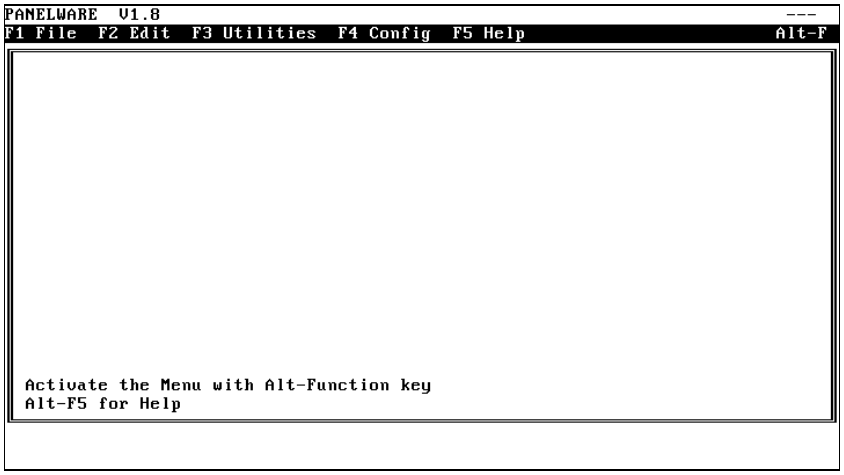
To start PCS, type the following command at the C: prompt, then press ↵ (if you installed the software on a drive other than C, substitute the correct drive ID for **C:**):

```
C:\panel
```

PCS is called up and the following copyright information is displayed on the screen:


PANELWARE V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help Alt-F
PANEL WARE
>> Version 1.8 <<
(C) Copyright 1994 GE Fanuc Automation North America, Inc.
All Rights Reserved
Activ
Alt-F

After a delay, the **Main** menu, with its pull-down menu line and messages, is displayed:



Section 3 General Operation

Pull-Down-Menus (Main Menu)

The pull-down menus of the **Main** menu can be opened at any time using two different methods:

- By pressing the **Alt** (alternate) key simultaneously with the desired function key (**F1** to **F5**)
- By pressing the **Alt** key simultaneously with the first letter of the desired menu name

For example, the **F1 File** menu can be opened by pressing either **Alt** + **F1** or **Alt** + **F**.

Once a menu is open, select the desired option by highlighting it using the cursor keys and pressing ↵. Any resulting window that the option calls up will be displayed in the blank window of the **Main** menu, with its associated function key line displayed below.

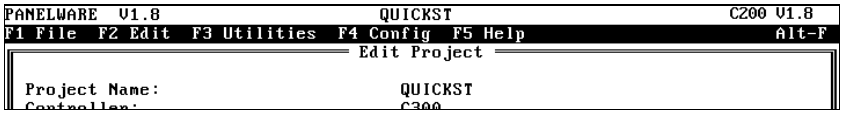
Key shortcuts (hot keys) for specific menu entries are displayed on the menu next to the associated entry.

Window Name

Every window that can be displayed within the **Main** menu has a name that is centered inside the top line margin of the window. For example:

- Window name **New Project**

- Window name **Edit Project**



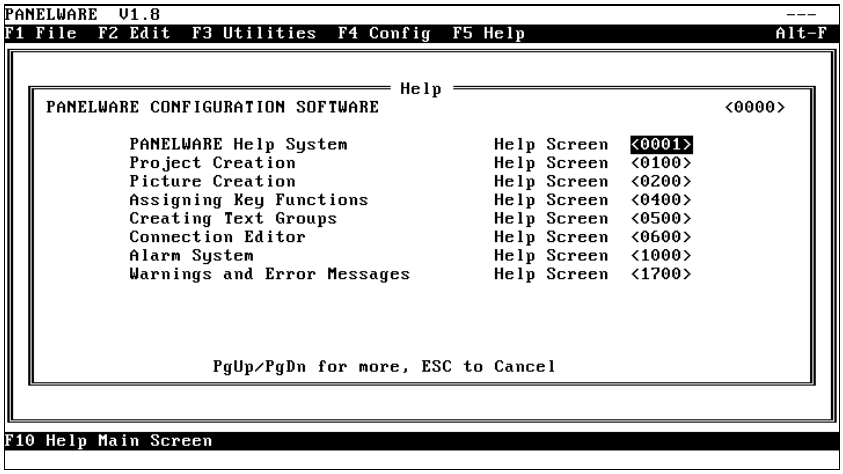
Selection Windows

If the ↵ character is displayed in the bottom line of a screen, a selection window can be opened by pressing ↵. A selection can be made from these windows by moving through the list using the cursor keys until the desired entry is highlighted, then pressing ↵.

Context-Sensitive Help Screens

While using PCS, context-sensitive help screens can be accessed at any time. If you press **Alt** + **F5** or **Alt** + **H** while working in PCS environment, a help screen that corresponds to the current PCS function/activity is displayed. Using the **PgUp** or **PgDn** keys, you can flip forward or backward through the help screens. If all of the help text in a Help screen can not be seen, the ↑ and ↓ (Cursor Up/Down) keys can be used to scroll through to the end.

On some Help screens, related (cross-referenced) help may be signaled by the presence of one or more Help screen numbers. These cross-references are indicated by the respective Help screen number that are displayed between the < and > characters (for example, Help Screen <0000>). The first of these numbers will be highlighted. The **Tab** and **BackTab** keys can be used to highlight a different screen number, then when you press ↵, that highlighted Help screen will be displayed. The **Alt** + **F1** key returns you to the previous Help screen level. Pressing **F10** returns you to the first Help screen <0000> at any time. The following example shows a typical Help screen:



To exit any Help screen, simply press **Esc**.

Screen Elements

The PCS display contains a few basic elements that are displayed at all times:

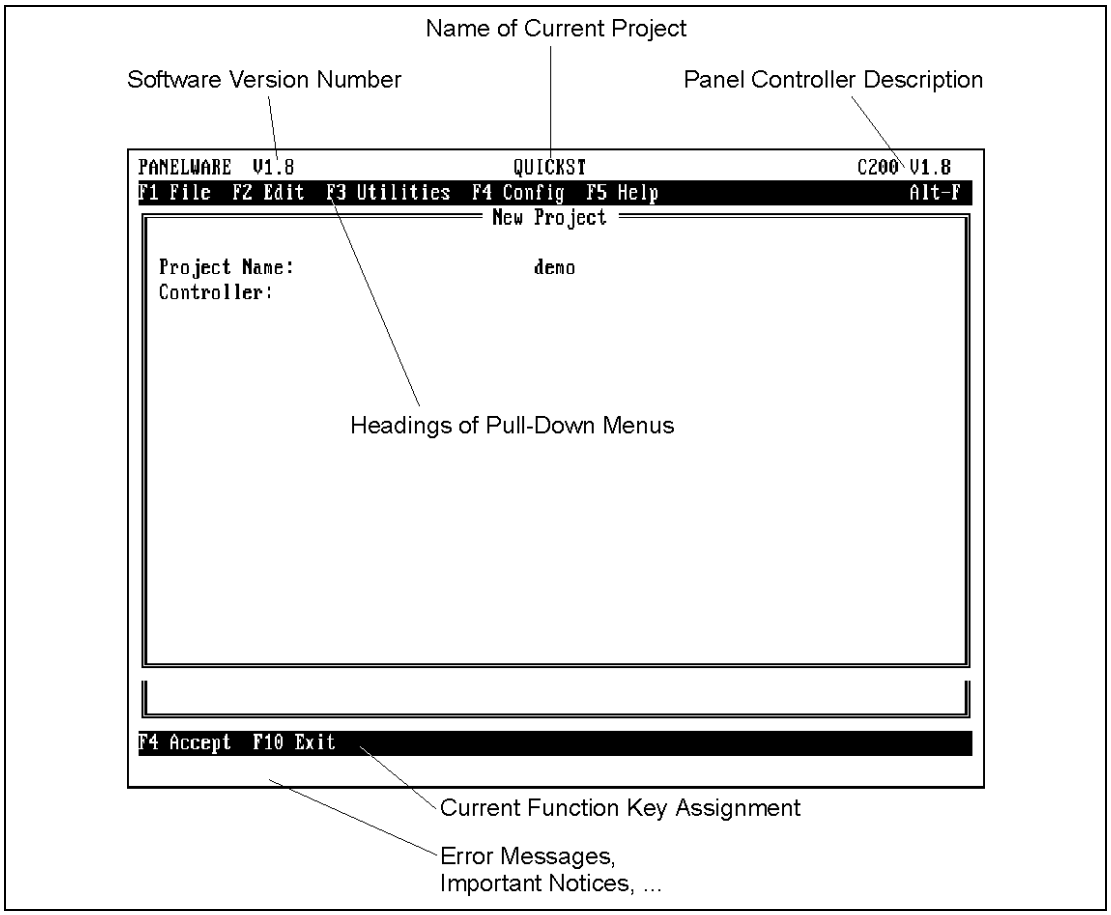


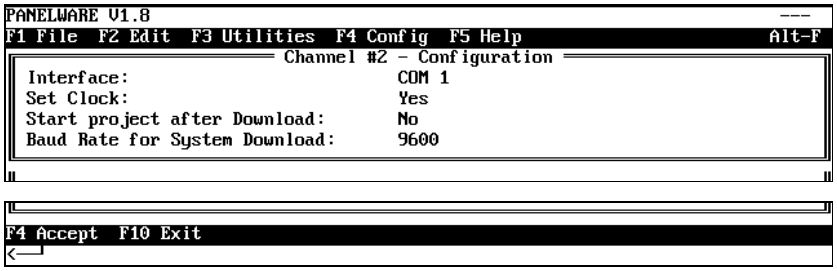
Figure 2 - 1. Basic PCS Screen Elements

- In the top line (title line) of the screen, the software version number is displayed at the left, the name of the current project is in the middle, and the Panel Controller description (type and operating system version) is on the right.
- The next line down (menu line) contains the headings of the pull-down menus.
- The second to the last line (function line) of the screen displays the current function key assignments.
- The bottom line (message line) contains any error messages, important notices that relate to the project, or the character ↵ to indicate that a selection window can be accessed.

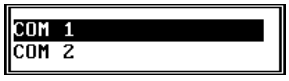
Section 4 PCS Configuration

Before you can begin creating projects using PCS, the appropriate interface to be used to connect your PC to the PANELWARE controller must be defined. The **F4 Config.** pull-down menu shown below can be opened by pressing **Alt** + **F4** or **Alt** + **C**:

To set up the interface, select the **Channel #2** command by highlighting the entry and pressing ↵. This opens a window that allows you to choose from several options. At this point, you are only concerned with selecting an interface. When you highlight the **Interface** option, it is displayed inversely in the window and is selected by pressing ↵.


PANELWARE V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help Alt-F
Channel #2 - Configuration
Interface: COM 1
Set Clock: Yes
Start project after Download: No
Baud Rate for System Download: 9600
F4 Accept F10 Exit

In a selection window, you can choose whether you want to use COM1 or COM2 as the PC interface to be used for programming the C200 Panel Controller. Once a serial interface (COM2, for example) is selected, the Panel Controller can be connected to this interface using a serial interface cable (see the *PANELWARE Hardware Installation User's Manual* — GFK-0848).



Note

The remaining Channel #2 options should be left at their default settings until you have successfully downloaded a project to the Panel Controller. See the *PANELWARE Configuration Software Reference Manual* (GFK-0849) for details on the Channel #2 configuration items.

Section 5 Quick Start Example

The remainder of this chapter presents an example project, called QUICKST, that you can create by following the steps that are outlined in the text. This sample project is designed to provide an overview of how PCS works.

When you have completed the Quick Start example, you are encouraged to look at the DEMO project described in Chapter 5. The DEMO project shows many of the powerful data display/manipulation options available in PCS. Chapter 5 includes step-by-step instructions for creating the demonstration project.

Hardware

The example project uses one each of the following hardware units:

- C200 Panel Controller
- 4 x 20 LCD display module
- one Keyblock Module with 16 keys
- one Keyblock Module with 12+4 keys
- one PLC capable of communicating via SNP

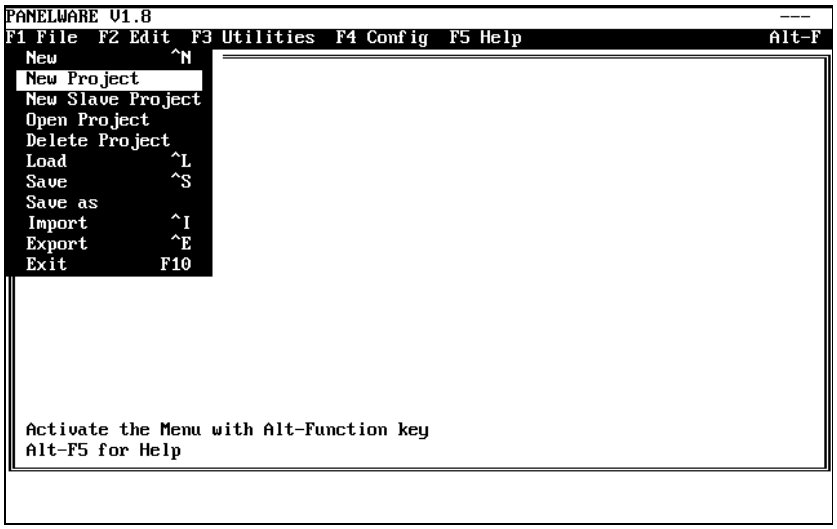
Assemble your PANELWARE modules according to the description in the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848) so that the 12+4 key Keyblock module is the first of the two Keyblock modules attached to the Panel Controller.

Note

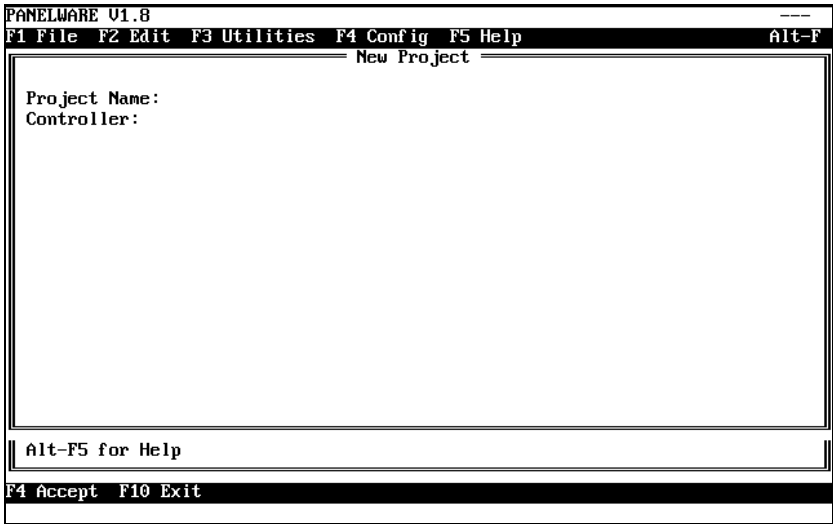
Although your hardware configuration may be different from that specified above, creating the example project is still recommended as an introduction to the basic techniques you will need to use for any hardware configuration.

Creating a New Project

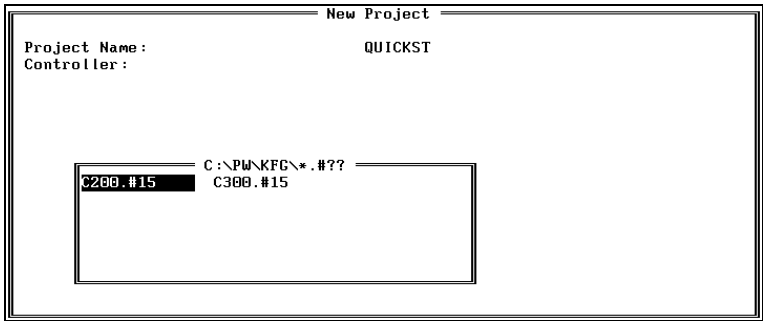
To create a new project, select the **New Project** function from the **File** menu. Or, **File** can be opened by pressing **Alt** + **F1** or **Alt** + **D** from the main menu. Select the function **New Project** from this main menu using the cursor keys:



After pressing the ↵ key, the **New Project** window, in which you can enter a project name and the type of the Panel Controller, appears:



Using the keyboard, enter the name of the project (***QUICKST***) in the cursor position **Project Name**. Pressing the ↵ key causes cursor to move to the next line. Here you can enter the name of the controller that you are using. If you press the ↵ key again, without entering a name, a selection window is opened in which you can choose the controller type.



Note

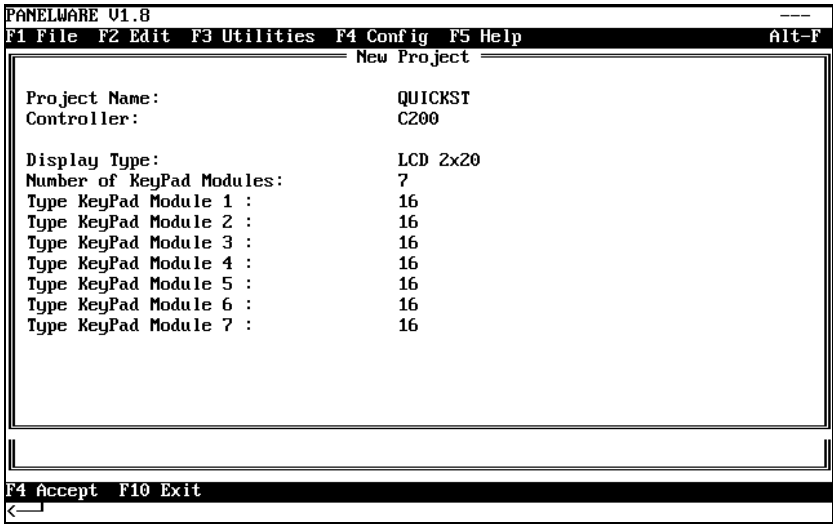
The available controllers are listed in the form <type>.#<OS version>, where <type> is the basic controller model (for example, C200) and <OS version> is the operating system version number.

Press the ↵ key to accept the selected controller.

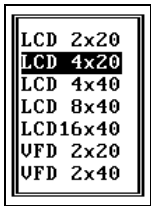
The next step is to configure the display type and the Keyblock modules:

Caution

Both the <u>controller and the display type</u> must be defined when creating a new project. Once selected, you CAN NOT change them. You should know which controller and display type will be used before the project creation process is started.

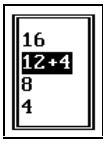

PANELWARE V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help Alt-F
New Project
Project Name: QUICKST
Controller: C200
Display Type: LCD 2x20
Number of KeyPad Modules: 7
Type KeyPad Module 1 : 16
Type KeyPad Module 2 : 16
Type KeyPad Module 3 : 16
Type KeyPad Module 4 : 16
Type KeyPad Module 5 : 16
Type KeyPad Module 6 : 16
Type KeyPad Module 7 : 16
F4 Accept F10 Exit

Move the cursor to the **Display Type** line and press ↵ to open a window that lists all display types:



Select one of the display types (in the example, LCD 4x20) and press ↵. The cursor jumps to the next line, **Number of Keyblock Modules**. Enter a number (1 through 7) and press ↵ to confirm the number of Keyblock modules in your configuration (***2***, in this example).

The next step is to define the individual Keyblock modules (all of the modules in the list do not have to be defined). When the cursor is in one of the **Type Keyblock Module x** lines, you can access a selection window that lists of Keyblock modules by pressing ↵.



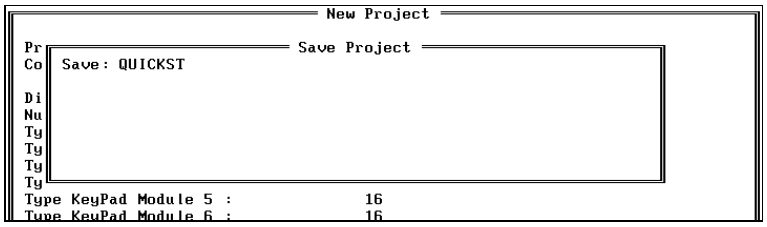
The following table defines the numbers in the **Keyblock Module** selection window:

Table 2 - 1. Keyblock Module Definitions

List Entry	Keyblock Module
16	16-key Keyblock module
12+4	Numeric Keyblock module
8	8-key Keyblock module
4	4-key Keyblock module

In this example, the numeric (12+4) and the 16-key Keyblock modules are selected as Keyblocks 1 and 2, respectively.

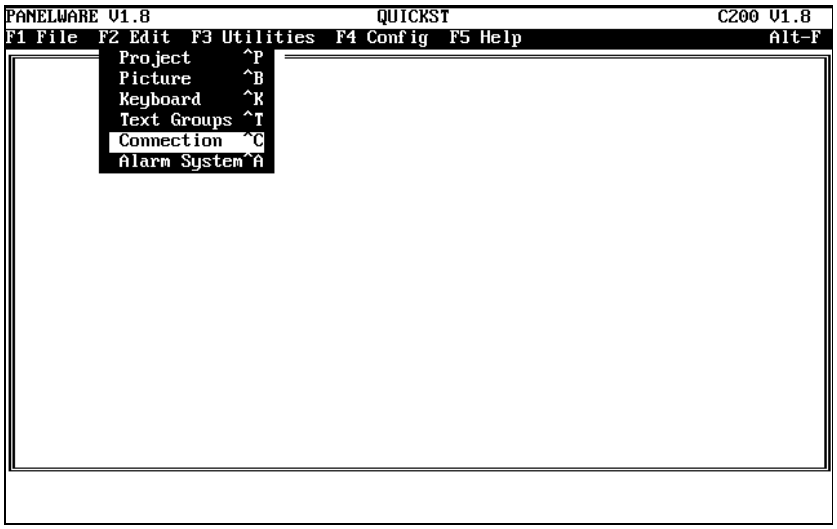
The new project definition can be closed and saved by pressing the **F4 Accept** function key. While the system is saving the project, the following screen is displayed:



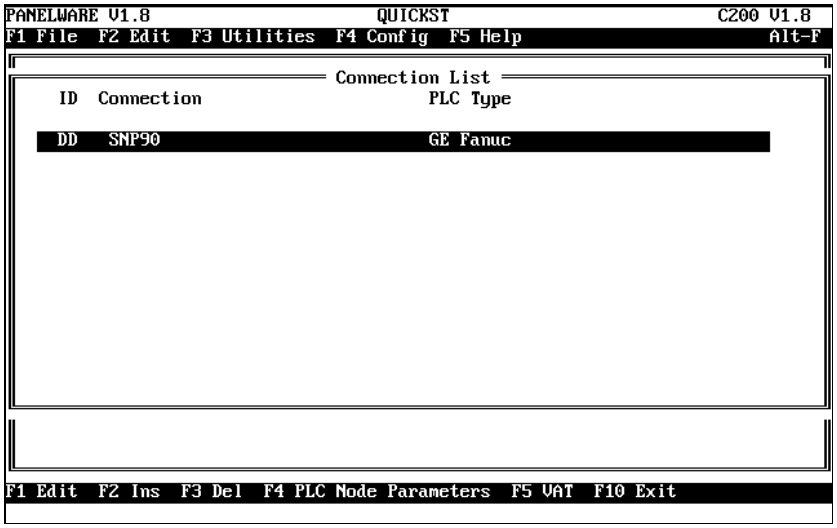
After the project is saved, the **New Project** window is closed and the project name (QUICKST) is displayed in the title line.

Defining Connections

The next step after creating a new project is to define the connections. All PLCs that are to communicate with the Panel must be entered in the connection editor. To change or insert connections, select the **Connection** function from the **Edit** pulldown menu:



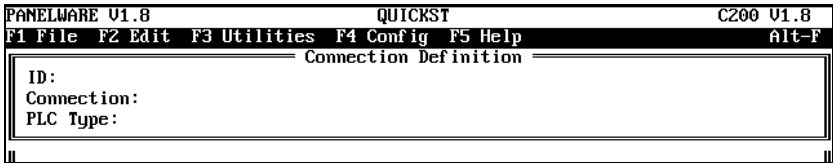
The following window, **Connection List**, displays all entered connections:



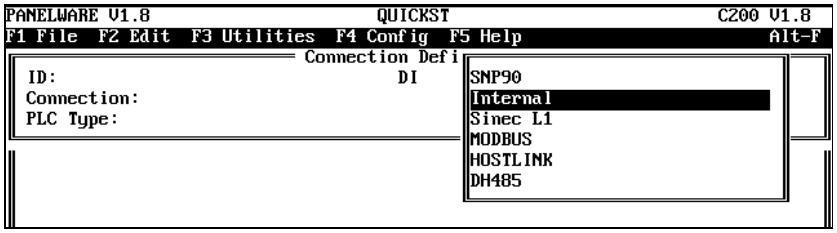
When creating a new project, a default entry that has the ID, **DD,** is made automatically (connection to a PLC in the GE Fanuc Series 90 controller family). Because the Panel will be communicating with only a single Series 90 PLC in this example, there is no need to insert an SNP90 connection. You can use the default **DD** connection.

Internal Connection

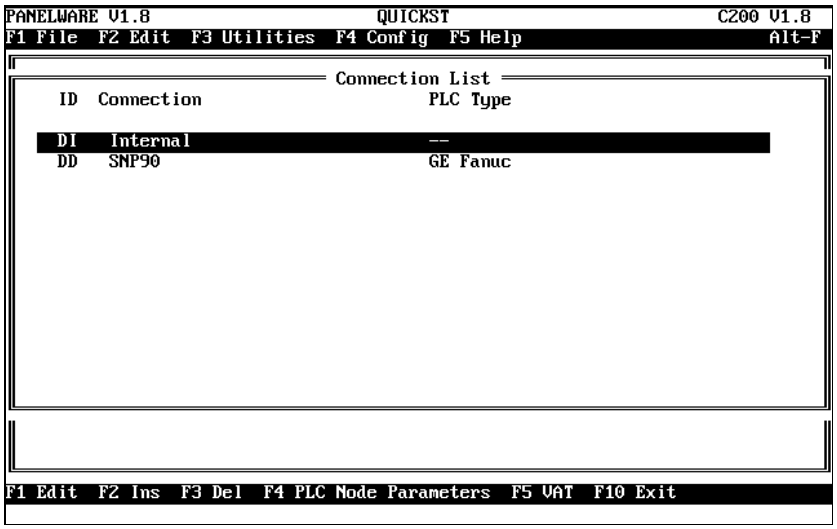
To insert an internal connection into the connection list, first press the **F2** (Ins) key to open the **Connection Definition** window.



Enter the ID, ***DI,*** in the window that appears. With the cursor in the **Connection** line, press ↵ to open a selection window and choose **Internal** as the connection.



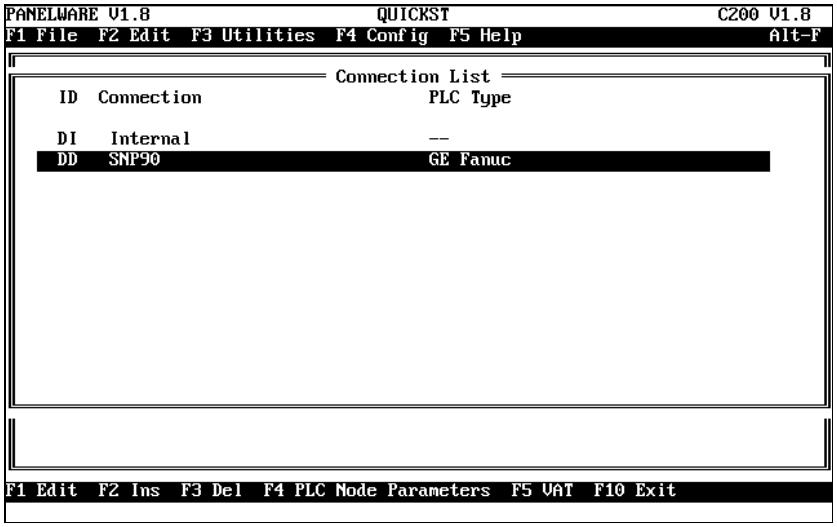
Press **F4 Accept** to confirm these definitions and display the new connection in the **Connection List**.



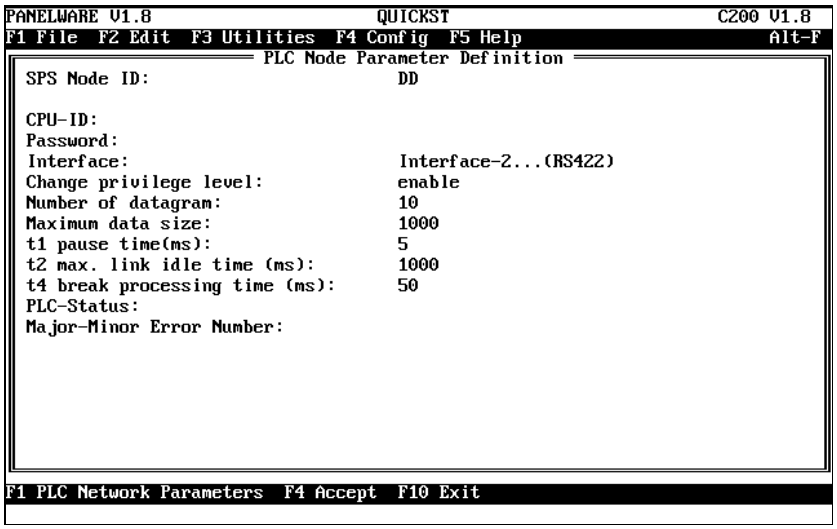
Protocol Parameters

To establish communications between the PANELWARE Panel and a GE Fanuc PLC, the protocol parameters for both the network and each individual connection must be set properly.

First, make sure that you are in the Connection List editor (See "Defining Connections" in this chapter). To set up the protocol parameters for the DD SNP90 connection, use the ↑ and ↓ cursor keys to highlight the **DD SNP90** connection.

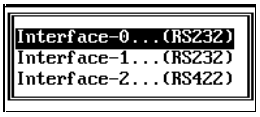


Press function key **F4 PLC Node Parameters** to open the **PLC Node Parameter Definition** window.

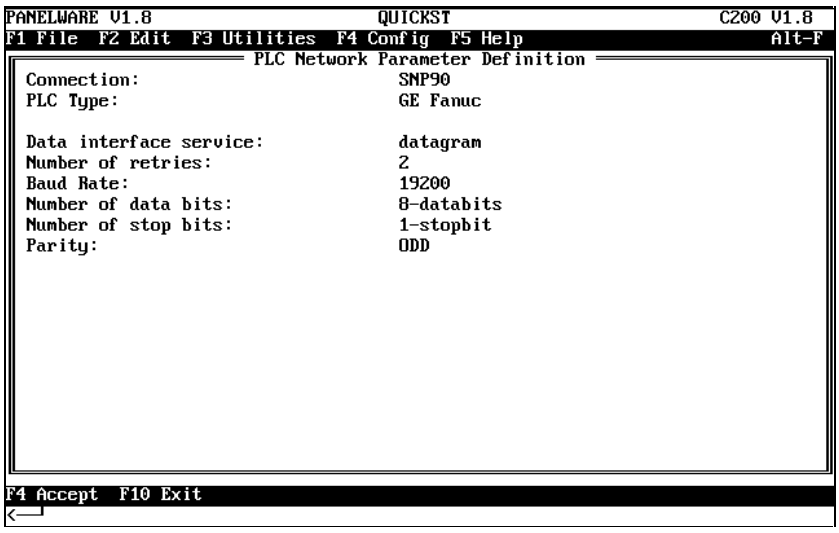


The PLC Node Parameters default settings should suffice for most projects, with the following exceptions:

- If your SNP cable is connected to multiple PLCs that are all powered up, you must enter, in the **CPU-ID** field, the SNP ID for the one you wish to communicate with.
- If the PLC you are communicating with has level 2 password protection, you must specify the password for level 2, 3, or 4 in the **Password** field ("write data" privilege).
- If you are using an RS-232 SNP cable to a CMM module, you must specify Interface-1...(RS232) in the **Interface** field.

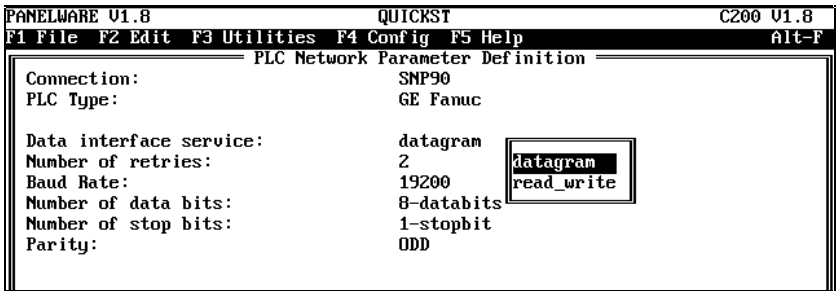


From the **PLC Node Parameter Definition** window, you can access the **PLC Network Parameter Definition** window by pressing function key **F1 PLC Network Parameters**. Here, you can set up the protocol parameters for the network.


PANELWARE V1.8 QUICKST C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help Alt-F
PLC Network Parameter Definition
Connection: SNP90
PLC Type: GE Fanuc
Data interface service: datagram
Number of retries: 2
Baud Rate: 19200
Number of data bits: 8-databits
Number of stop bits: 1-stopbit
Parity: ODD
F4 Accept F10 Exit

Again, the default settings should suffice for most projects, with the following exceptions:

- If your SNP cable is connected to a 90-30 CMM module whose other port is simultaneously supporting a separate SNP network (a connection to Logicmaster 90 programming software), you must change the **Data Interface Service** field from **datagram** to **read_write**.



- If any of the settings for baud rate, number of data bits, number of stop bits, or parity do not match your PLC connection, then you must change the appropriate field(s). The default PANELWARE settings must match the default PLC settings.

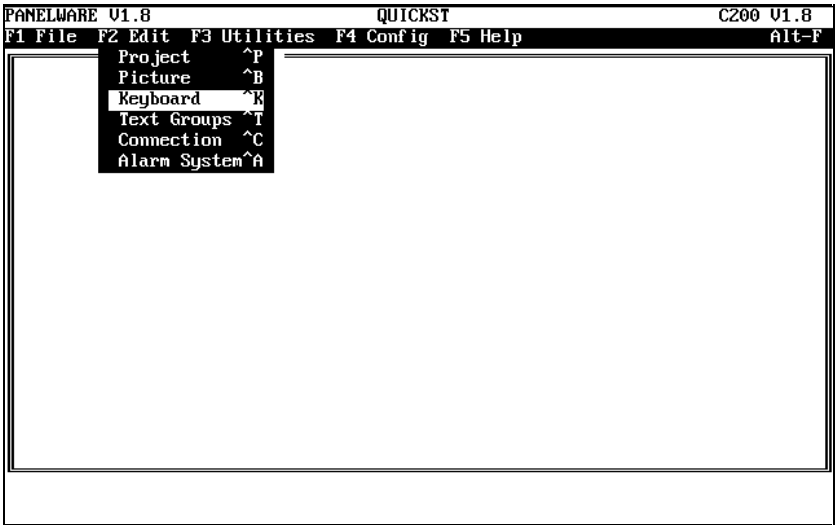
If you have made any changes in the **PLC Network Parameter Definition** window, press **F4 Accept** to save your changes. Otherwise, press **F10 Exit**. In either case, you will be returned to the **PLC Node Parameter Definition** window.

Again, if you have made any changes on the **PLC Node Parameter Definition** window, press **F4 Accept** to save your changes; Otherwise, press **F10 Exit**. In either case, you are returned to the **Connection List** window. Press **F10 Exit** again to return to the main menu.

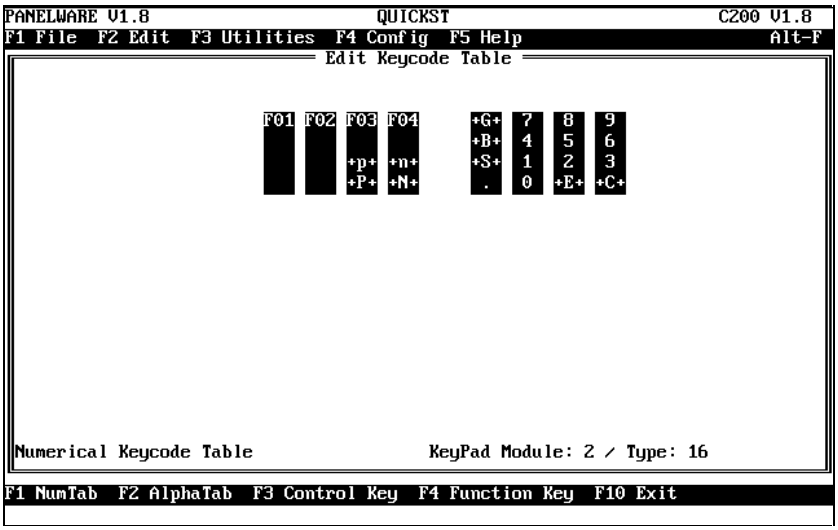
Key Assignments

Every key on every Keyblock module can be defined according to the project's unique needs. You can also assign keys for numbers, letters, and the **Next** and **Previous** functions.

In order to assign functions to the keys, the **Edit Keycode Table** window must be accessed by selecting the **Keyboard** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **K**:



The **Edit Keycode Table** window shown below is displayed (the default keycode settings that are shown will work for this example project):


PANELWARE V1.8
QUICKST
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Edit Keycode Table
F01 F02 F03 F04
+p+ +n+
+P+ +N+
+G+ 7 8 9
+B+ 4 5 6
+S+ 1 2 3
. 0 +E+ +C+
Numerical Keycode Table
KeyPad Module: 2 / Type: 16
F1 NumTab F2 AlphaTab F3 Control Key F4 Function Key F10 Exit

Save the key assignments by pressing the **F10 Exit** function key.

The abbreviations on the Keyblock module keys have the following meanings:

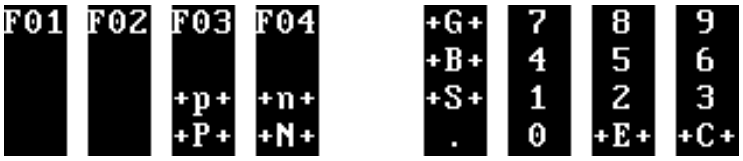


Table 2 - 2. Keyblock Abbreviation Definitions

Abbr.	Description
F1 ... F4	Function keys 1 through 4 (used for commands and picture changes)
+p+	Moves cursor to the previous INPUT field
+n+	Moves cursor to the next INPUT field
+P+	Changes to the previous picture
+N+	Changes to the next picture
+G+	Global alarm acknowledgment
+B+	Backspace; deletes the character before the cursor in an INPUT field
+S+	Changes the sign in a numerical INPUT field
+E+	Enter key; transmits the value entered in an INPUT field; labeled as ↵ on actual Keyblock
+C+	Cancels (deletes) an INPUT field; labeled as ← on actual Keyblock
.	Decimal point
0 ... 9	Numbers 0 - 9 for the entry of numbers

Creating Pictures

Pictures make up the basic elements of every Panel project. They include static elements such as text and lines[1], and/or dynamic elements like input and output fields. Output fields allow information (such as temperature, RPM, etc.) to be updated and displayed for the operator. Input fields can be used to display entries given to the process that you enter using the keyboard.

A project must contain at least two pictures—one picture that displays when the Panel powers up, and another that displays in the event of a communications failure. This example project will contain three pictures, as follows:

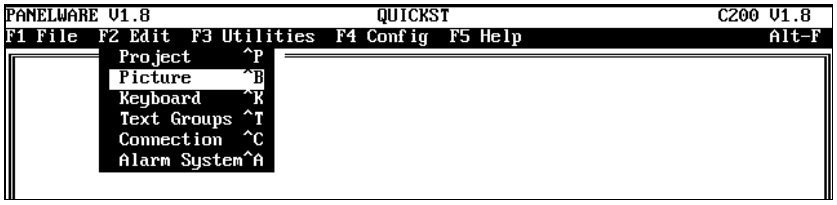
Picture 1 (Pict_1) is the picture where values will be entered using the keyboard, transmitted to the PLC and output in another field.

Picture 2 (Start-up) is the start-up picture that is to be displayed when the Panel and PLC are switched on. Only the date and time will be displayed.

Picture 3 (Error) is displayed if there is a communications failure between the PLC and the Panel. Only text providing notice of a communications error will be displayed in this picture.

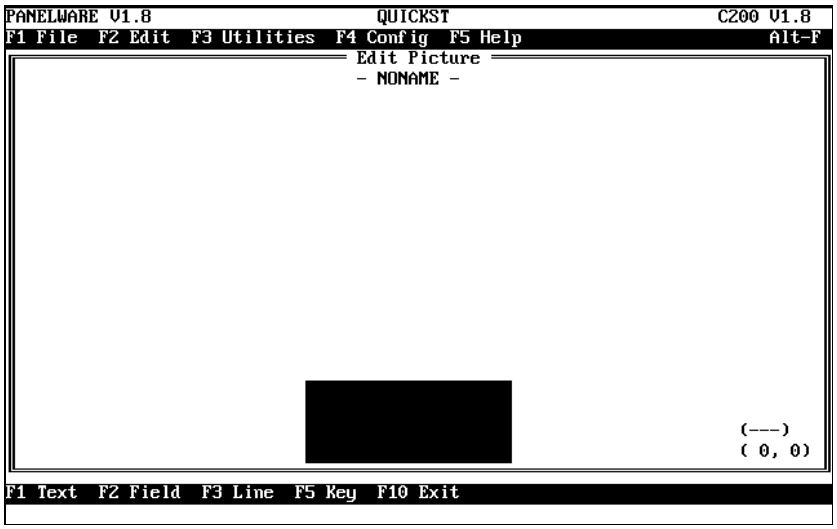
Picture 1 (Pict_1)

To edit or create a picture using the picture editor, select the **Picture** option from the **F2 Edit** pull-down menu or press **Ctrl + B**.



[1] Lines can only be inserted in a picture if a graphic display has been selected in the project definition. See the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848) for a list of available graphic displays.

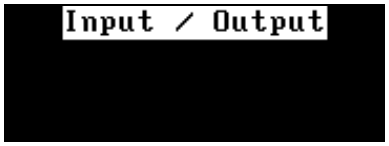
The blank **Edit Picture** window shown below is displayed:



The size of the dark rectangle (picture) at the bottom of the screen corresponds to the selected display type (display type LCD 4x20 is shown above, i.e., the rectangle consists of 4 lines and 20 characters per line). Text or fields can now be entered into this rectangle.

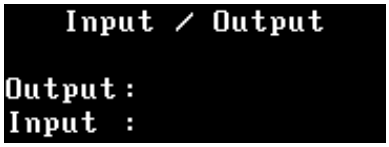
In the first line, enter the text ***Input / Output*** as follows:

Move the cursor to position (3,0) (the current cursor position is indicated in the lower right-hand corner of the screen as Column/Row). A text field can now be created simply by typing in the desired text (Input / Output). It is also possible to start a text field by pressing the **F1 Text** function key and then entering the desired text.

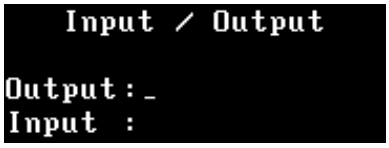


As long as the cursor is within this text field, the field is displayed inversely (on color monitors it has a red background). Press ↵ to complete the text field. The inverse display is switched off and the text is displayed normally.

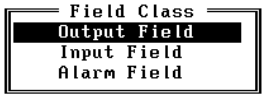
Move down to the third and fourth lines, and enter the following text:



Next to the **Output:** text, begin creating an output field by moving the cursor to the following position:

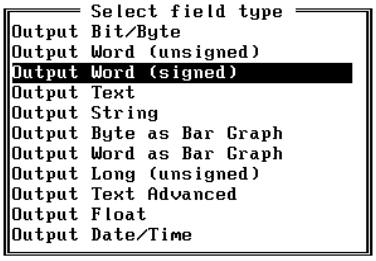


Press the **F2 Field** function key to open the **Field Class** selection window.

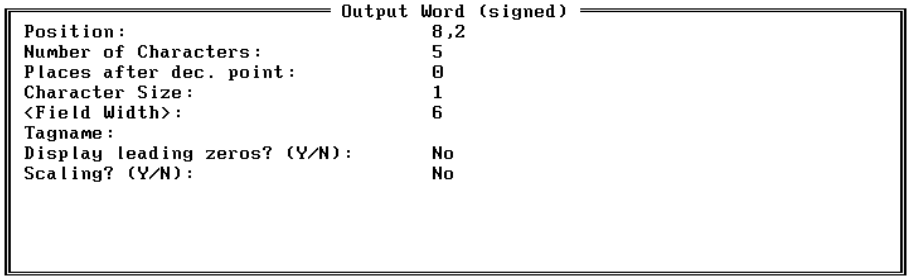


Select the **Output Field** entry from the list and press ↵ to access the **Select Field Type** window.

Several output field types can be chosen from this window:



For this example, select the **Output Word (signed)** field type. This results in a data entry form (with default entries) being opened on the screen.



In the **Output Word** window, change the following entries as shown by highlighting them using the cursor keys, then typing the new text:

Places after dec. point:	**2**
Tagname:	**VALUE1**

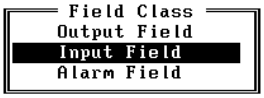
Note

To complete an entry, you MUST press ↵. If you change an entry and then press a cursor key instead, your entry will be ignored and the previous contents of the entry will be restored.

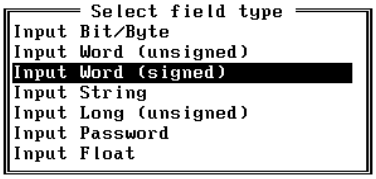
"VALUE1" is a symbolic name for a memory location in the PLC. Assigning symbolic names to the actual PLC addresses is accomplished using the connection editor.

Press the **F4 Accept** function key to close the field and confirm it as part of the picture. The field should be displayed within the picture:

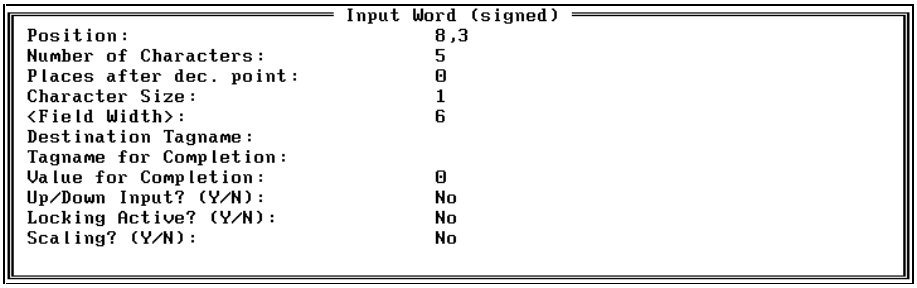
Move the cursor to the **Input:** text line and press the **F2 Field** function key. Select the **Input field** option from the **Field Class** window that is displayed:



The **Select Field Type** window containing all of the input field types is displayed.



For this example, select the **Input Word (signed)** field type:



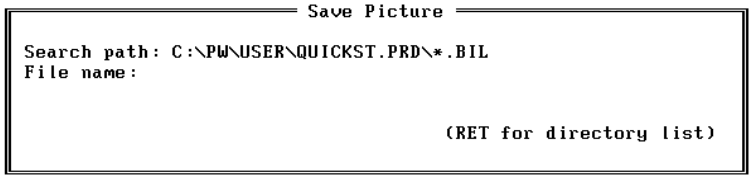
In the **Input Word** window that is displayed, change the following entries as shown by highlighting them using the cursor keys, then typing the new text:

Places after dec. point : 2
Destination Tagname: VALUE1

Press the **F4 Accept** function key to close the field and confirm it as part of the picture. The field should be displayed within the picture as shown below:

Press the **F10 Exit** function key to end this picture editing session. Because this is a new picture, a window will open to confirm whether or not the picture should be saved:

Type ***Y*** to request that the picture be saved, and a prompt will request you to enter the filename under which the picture will be saved:



Type the desired filename using the keyboard (***PICT_1*** for this example). The picture is saved under the filename you type and assigned a .BIL extension (PICT_1.BIL) automatically when you press ↵.

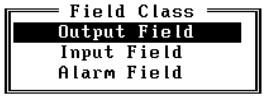
Picture 2 (Start-up)

Picture 2 will serve as the start-up picture for the project.

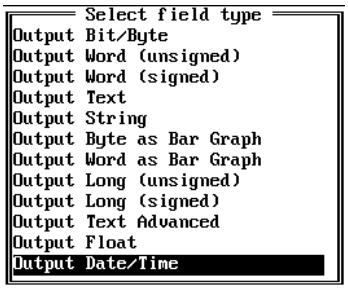
Access the picture editor by selecting the **Picture** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **B**.

In line 1 of the rectangle, type the text ****** Start-up Pict ****** and press ↵.

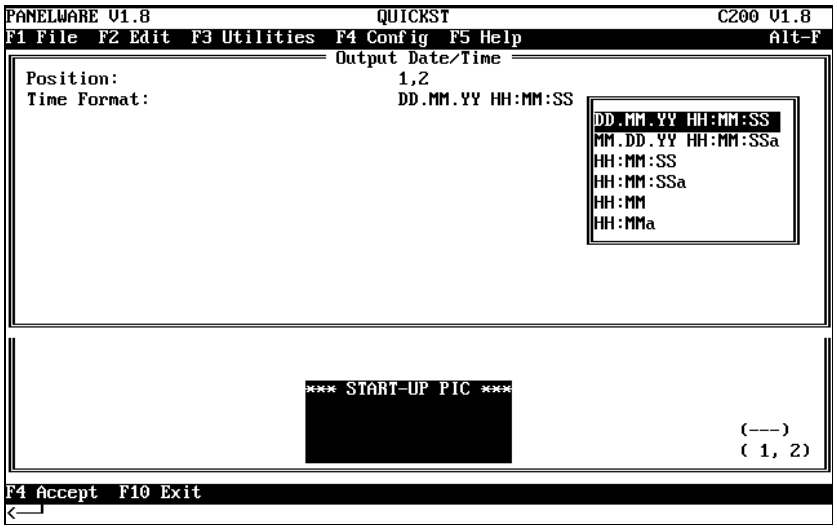
Move the cursor to position (1,2) and press the **F2 Field** function key, then select the **Output Field** option from the **Field Class** window:



From the **Select field type** window that is displayed, select the **Output Date/Time** option:



The output format for the date and time is selected from the following window that is displayed:



Do not make any changes in this window and press the **F4 Accept** function key. The Date/Time field will be displayed in the start-up picture:

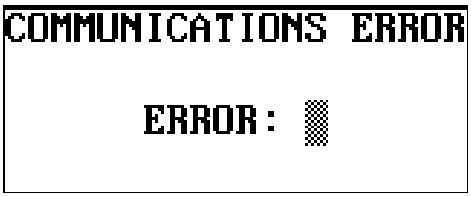
Press the **F10 Exit** function key to end this picture editing session. Because this is a new picture, a window will open to confirm whether or not the picture should be saved.

Type ***Y*** to request that the picture be saved, then type the desired filename (START-UP) using the keyboard. The picture is saved under the name you type and assigned a .BIL extension automatically when you press ↵.

Picture 3 (Error)

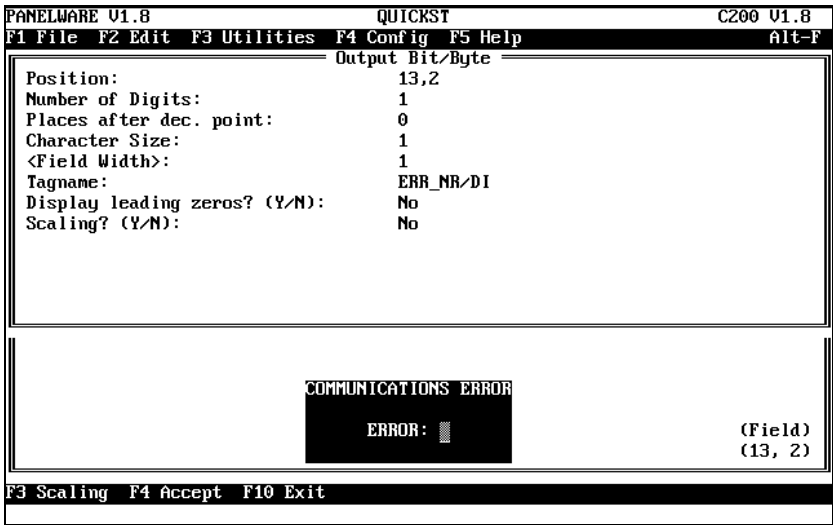
An *error* picture that will display on any communication error is created in exactly the same way as any other picture. Input or output fields that would access variables from the PLC are of no use, however, because the error picture is intended to show an error in communications. Internal variables (error variables that are used to display the type of communications error) *can* be shown. See the *PANELWARE™ Configuration Software Reference User's Manual* (GFK-0849) for details.

Using the steps followed to create the first two pictures, create the following error picture and save it under the name ERROR:



One output field will be inserted into this picture, in which an error number will be displayed if a communications error occurs. This error number can only be displayed if an internal connection has been created. If you have followed all steps in the Quick Start example, the needed internal connection will exist.

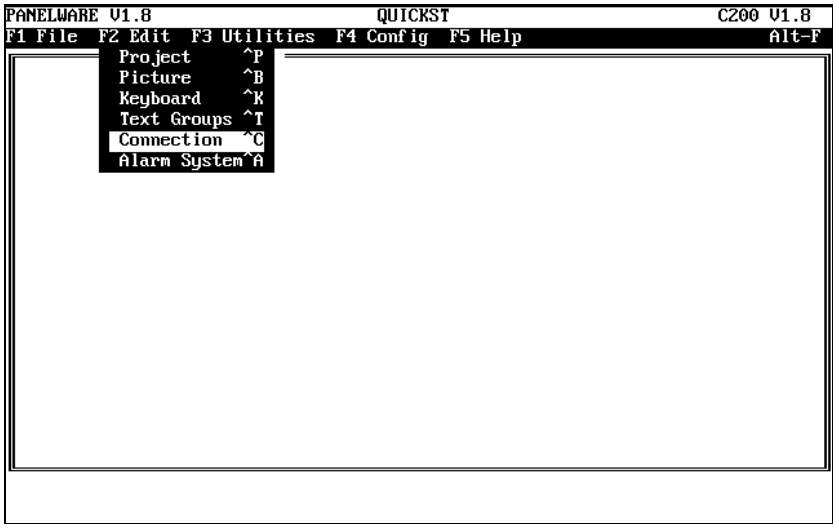
The output field is defined as in the following screen (Field parameters).



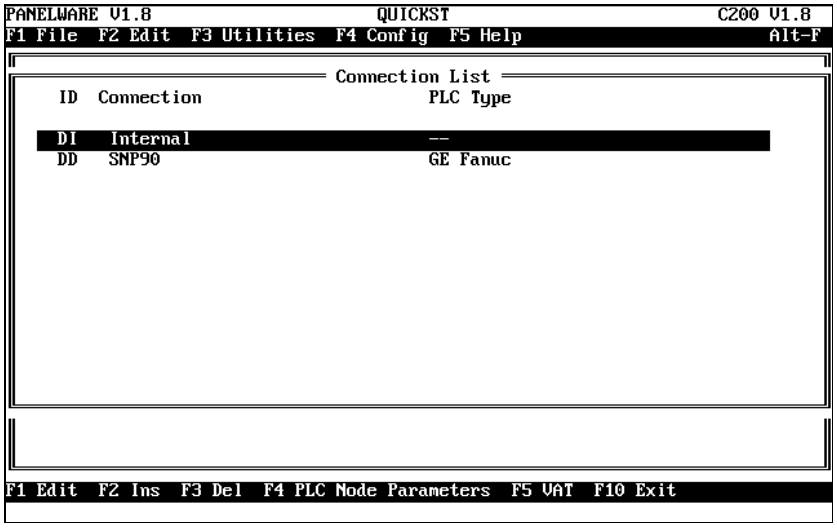
Editing Variable Assignments

All variables used in the project (symbolic variable names) must be connected to specific addresses in the PLC CPU.

In order to define these connections, access the connection list by selecting the **Connection** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **C**.



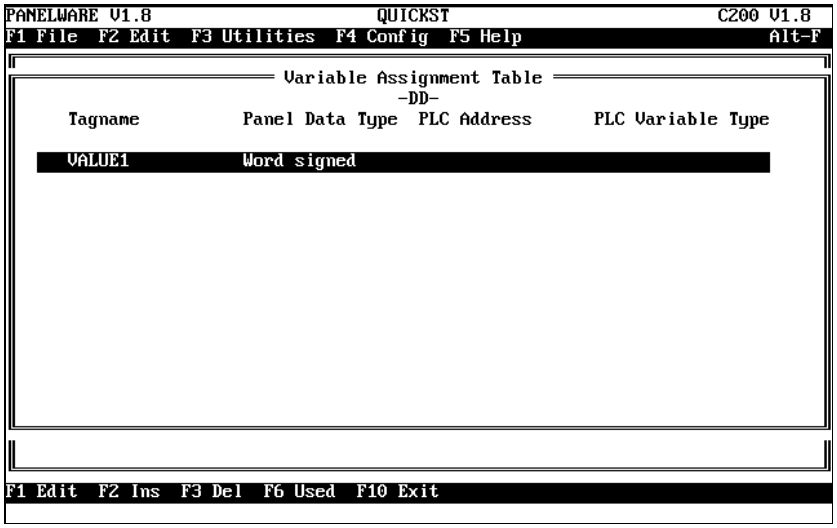
The **Connection List** window shown below is opened:


PANELWARE V1.8
QUICKST
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Connection List
ID Connection PLC Type
DI Internal --
DD SNP90 GE Fanuc
F1 Edit F2 Ins F3 Del F4 PLC Node Parameters F5 VAT F10 Exit

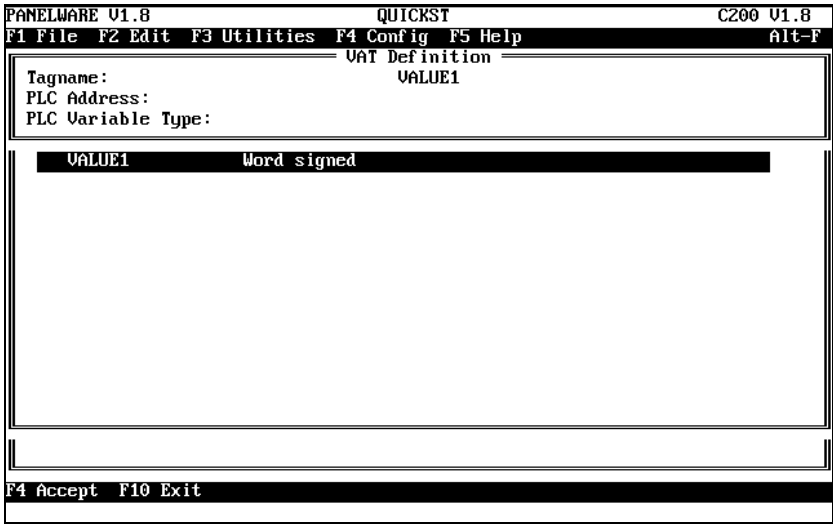
SNP90 Connection

Using the ↑ and ↓ (up and down) cursor keys, select the **DD SNP90** connection and press the **F5 VAT** function key to display the associated variable assignment table (VAT) on the screen.

All variables that have been used in a picture's input or output fields in the project, for this connection, are listed in the **Variable Assignment Table** window. In this example project, only one name, VALUE1, is displayed:

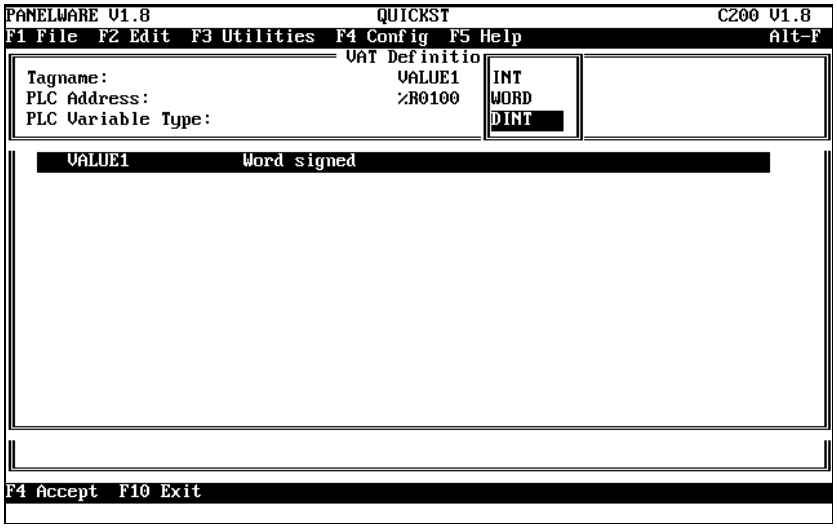


In order to assign an address in the PLC CPU to the VALUE1 variable, press the **F1 Edit** function key. The **VAT Definition** window shown below is opened:

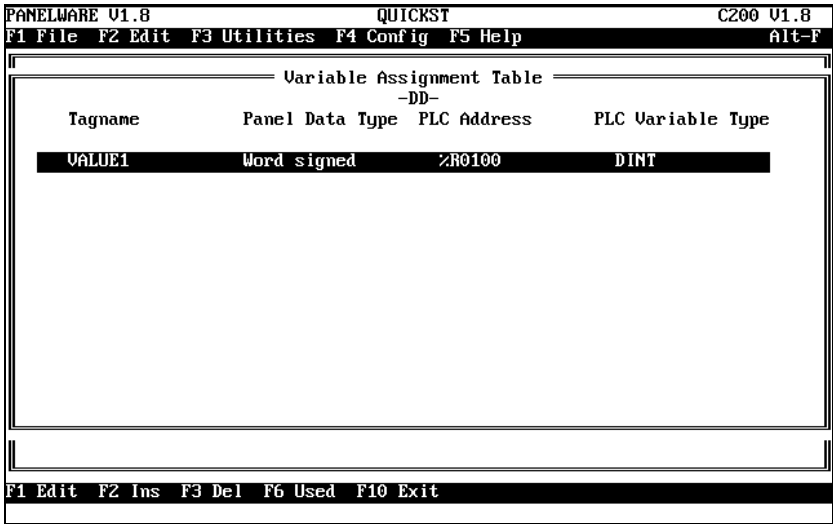


The PLC address can be entered directly at the PLC Address line using the keyboard (for example, ***%R0100***).

If the cursor is in the **PLC Variable Type** line, a variable type selection window that shows all valid variable types can be opened by pressing ↵ .



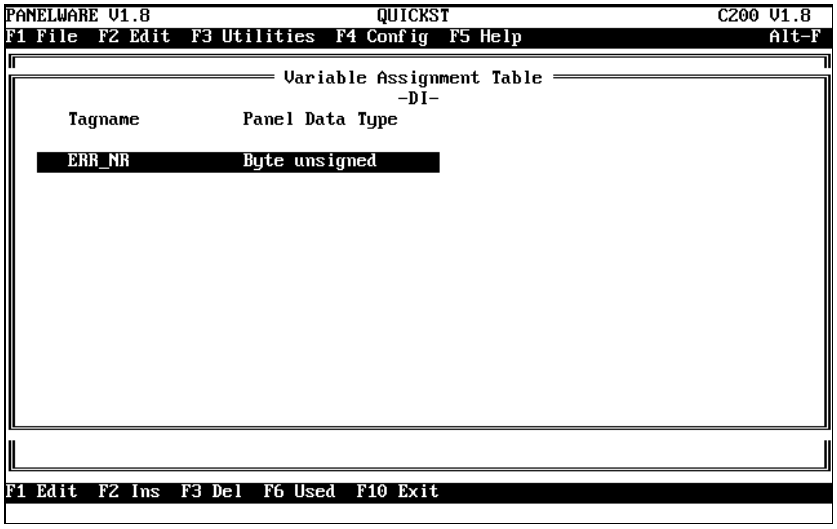
Select **DINT** from the selection window. The definition that is entered can be saved by pressing the **F4 Accept** function key. Once saved, the newly selected variable is shown in the VAT.



Press the **F10 Exit** function key twice to return to the **Connection list**.

Internal Connection

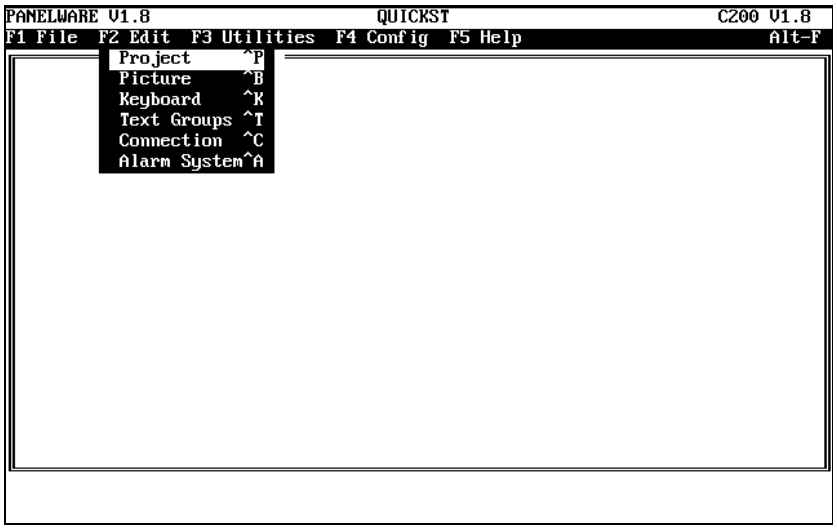
Using the cursor keys, select the **DI Internal** connection and press the **F5 VAT** function key to display its associated **Variable Assignment Table**.



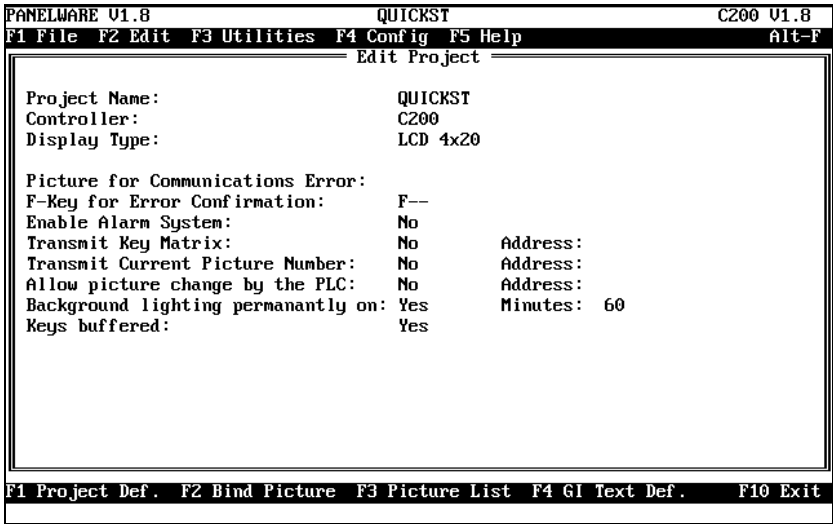
This is the variable that will be output in the error picture. The internal variables do not require any editing. You can close the variable assignment table by pressing **F10 Exit;** pressing **F10** a second time returns you to the main menu.

Binding Pictures in the Project

The pictures that you have created for this project still have to be bound into the project definition. To begin the binding process, select the **Project** option from the **F2 Edit** pull-down menu or press **Ctrl** + **P**.



The **Edit Project** window shown below is opened:


PANELWARE V1.8
QUICKST
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Edit Project
Project Name: QUICKST
Controller: C200
Display Type: LCD 4x20
Picture for Communications Error:
F-Key for Error Confirmation: F--
Enable Alarm System: No
Transmit Key Matrix: No Address:
Transmit Current Picture Number: No Address:
Allow picture change by the PLC: No Address:
Background lighting permanantly on: Yes Minutes: 60
Keys buffered: Yes
F1 Project Def. F2 Bind Picture F3 Picture List F4 GI Text Def. F10 Exit

The picture binding process for this project consists of the following three steps:

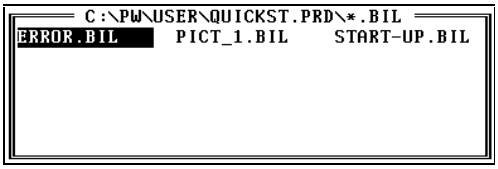
1. Entering the filename of the ERROR picture
2. Binding the three project pictures
3. Organizing the picture directory

These processes are explained in the sections that follow.

Picture for a Communications Error

From the **Edit Project** window, press the **F1 Project Def.** function key to move the cursor to the **Picture for Communications Error** line in the window. The function line options are changed as shown below:

The file name of the error picture can be entered directly using the keyboard or the following selection window can be accessed by pressing the **F5 Pictures** function key.

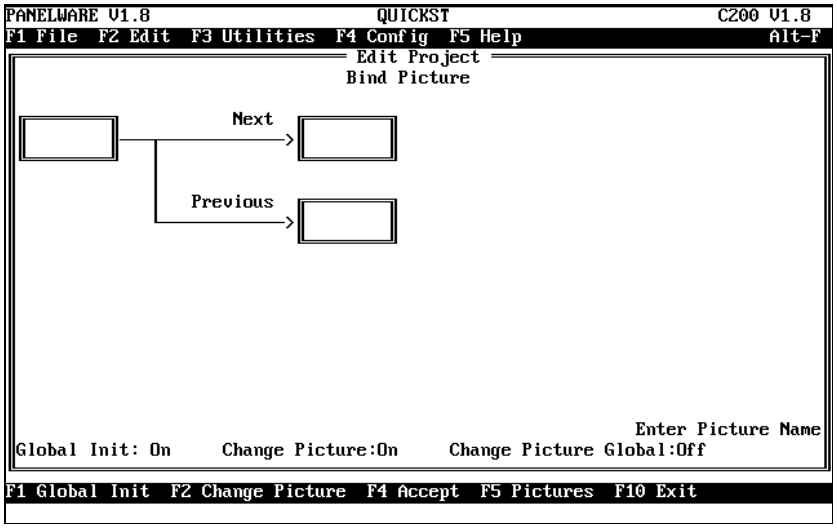


Highlight the desired filename and press ↵, then confirm the project definition by pressing the **F4 Accept** function key.

Picture Binding Overview

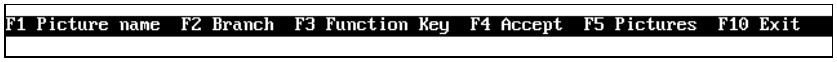
Binding a picture into the project means that all possible branches (picture changes) that the picture can have are defined. A picture change can be made using the **Next**, **Previous** or **optional** function keys[2].

When you press the **F2 Bind Picture** function key from the **Edit Project** window, the **Bind Picture** window appears on the screen:



When the cursor is located in one of the boxes in the window, a picture name can be entered directly by using the keyboard or a selection window containing picture names can be accessed by pressing the **F5 Pictures** function key.

In the first box (left-hand side of the screen), enter the name of the picture to be bound into the project. When you press ↵, the picture is accepted and the cursor moves to the upper right-hand box. You can switch between the upper and lower right-hand boxes using the cursor keys. When the cursor is in one of the boxes on the right-hand side, the function line at the bottom of the screen changes as shown below:



Press the **F1 Picture name** function key to move the cursor back to the box on the left-hand side of the screen.

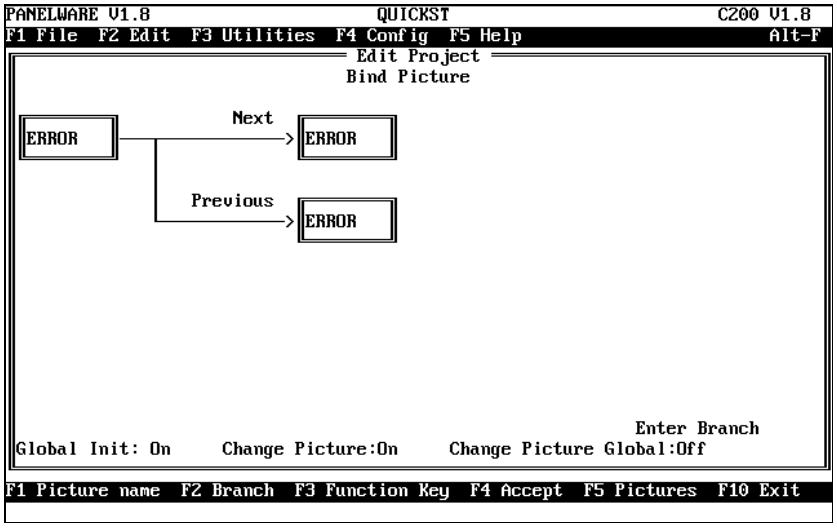
Use these cursor location controls to bind this project's pictures as described in the following sections.

---

[2] You can define keys to be used for Next, Previous or function keys (see “Key Assignments” in this chapter).

Error Picture

Bind the ERROR picture into the example project as follows:



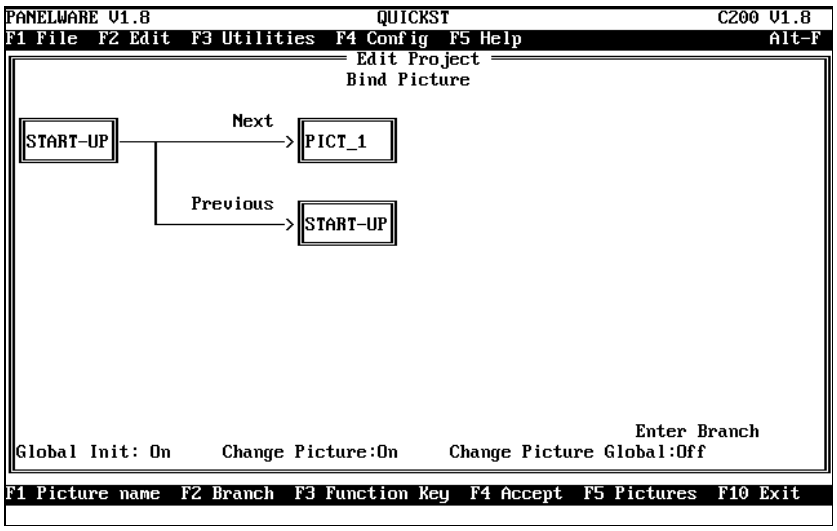
Caution

You should not branch from the ERROR picture to a picture that contains fields displaying data from the PLC because these fields will not be updated or processed if a communications error occurs.

Save the configuration by pressing the **F4 Accept** function key.

Start-up Picture

Bind the START-UP picture into the example project as follows:

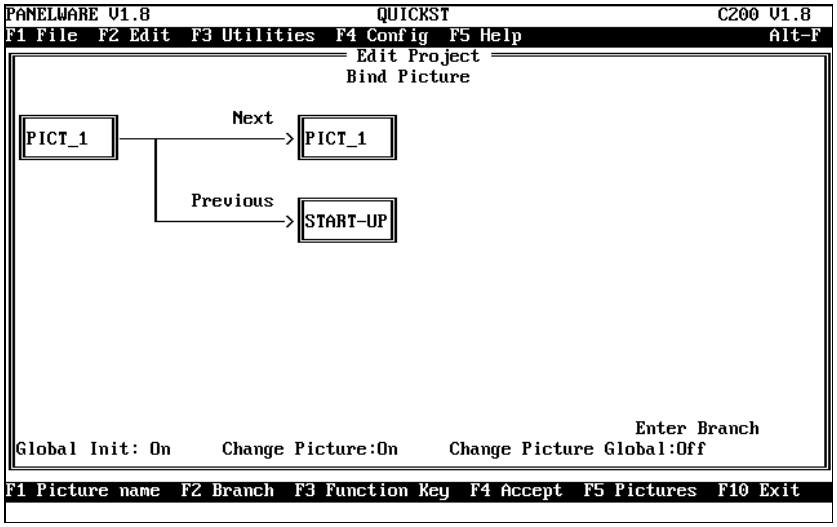


If the START-UP picture is bound into the project as shown, the operator will be able to switch to the PICT_1 picture by pressing the **Next** key. Pressing the **Previous** key will cause a refresh of the screen for the START-UP picture.

Save the configuration pressing the **F4 Accept** function key.

Pict_1

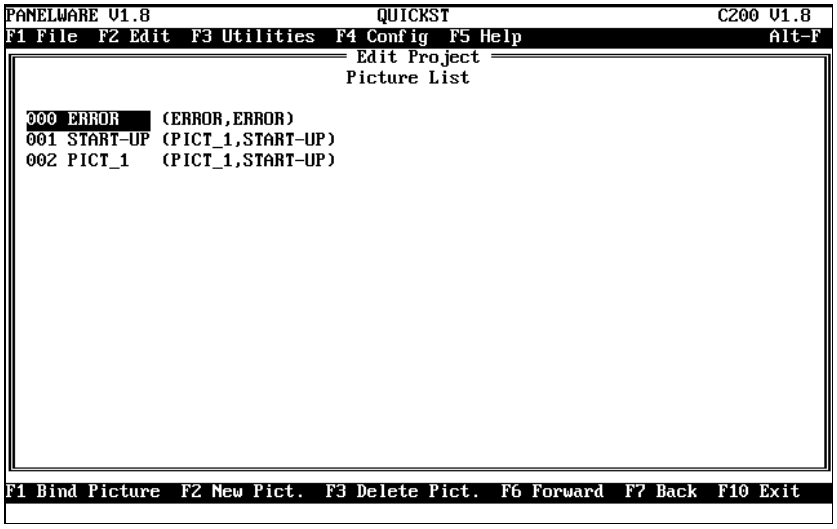
Bind the PICT_1 picture into the example project as follows:



If the PICT_1 picture is bound into the project as shown, the operator will be able to switch back to the START-UP picture using the **Previous** key. The **Next** key performs a refresh of the screen for the PICT_1 picture. Save the configuration by pressing the **F4 Accept** function key.

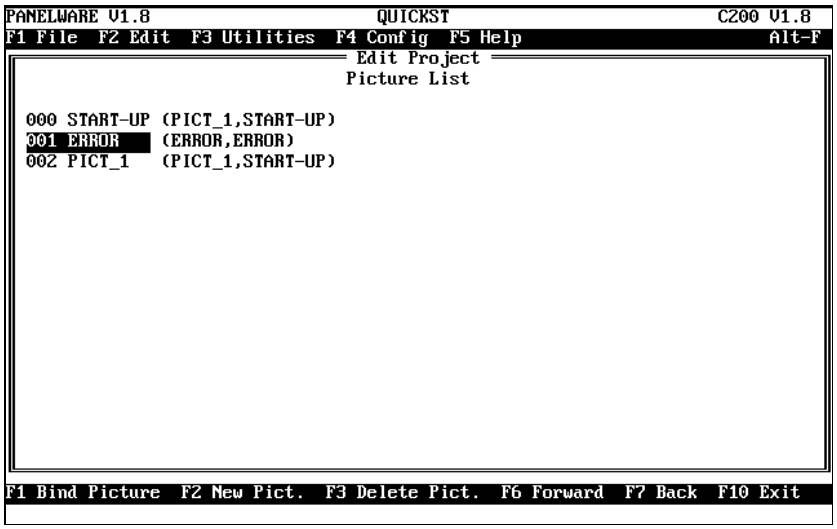
Picture Directory Organization

When you press the **F3 Picture List** function key, a list of all of the pictures that are bound to the project is displayed:


PANELWARE V1.8
QUICKST
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Edit Project
Picture List
000 ERROR (ERROR,ERROR)
001 START-UP (PICT_1,START-UP)
002 PICT_1 (PICT_1,START-UP)
F1 Bind Picture F2 New Pict. F3 Delete Pict. F6 Forward F7 Back F10 Exit

The picture defined as the ERROR picture is not allowed to be placed in the top position in the picture list; the picture in the top position must be the one initially displayed when the Panel is power cycled (start-up picture).

Accordingly, in this example, the ERROR picture must be moved down from its top position in the list using the **F7 Back** function key. This will move the item in the current cursor position down one line in the list, and move the next item one line up as shown below:


PANELWARE V1.8
QUICKST
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Edit Project
Picture List
000 START-UP (PICT_1,START-UP)
001 ERROR (ERROR,ERROR)
002 PICT_1 (PICT_1,START-UP)
F1 Bind Picture F2 New Pict. F3 Delete Pict. F6 Forward F7 Back F10 Exit

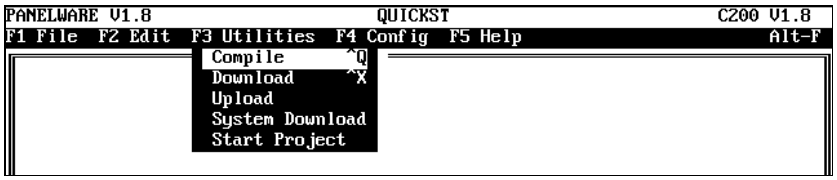
The START-UP picture should now be in the correct position (000).

Press the **F10 Exit** function key to save the changes and redisplay the **Edit Project** window. Press **F10 Exit** again to return to the **Main** menu.

Compiling the Project

In order to create, transfer and run your project on the Panel, it must be compiled (translated).

To compile the example project, select the **Compile** option from the **F3 Utilities** pull-down menu or press **Ctrl** + **Q**:



The compilation procedure status messages are displayed in the **Project Compiler** window that is displayed. If the project is compiled successfully, the following message is displayed:

The amount of memory the project will occupy in the user memory in the Panel (User Flash) is also displayed.

Press **Esc** to close the **Project Compiler** window and return to the **Main** menu.

Downloading the Project to the Panel

In order to download a compiled project to the Panel, the Panel must first be connected to the PC. The connection and the cable that should be used are described in Appendix A of the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848)

Caution

Ensure that the cable is connected to the serial interface of the PC that is defined as Channel #2 in the configuration (COM1 or COM2).

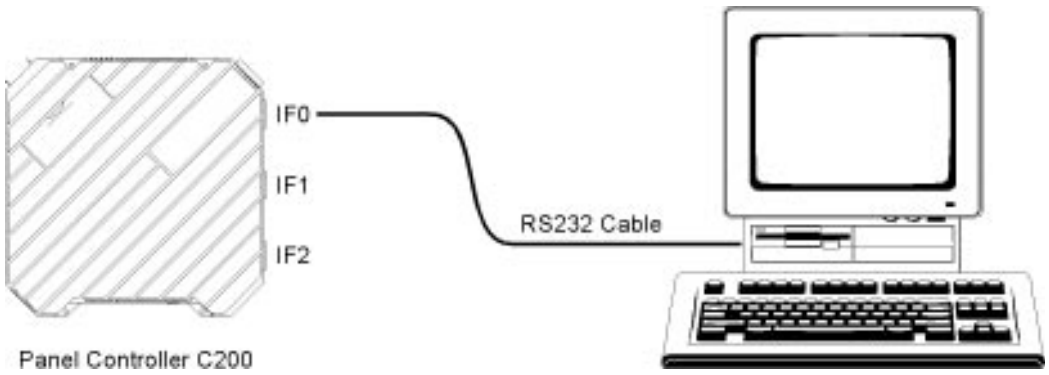


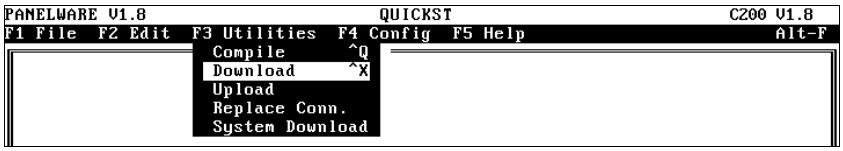
Figure 2 - 2. Panel/PC Serial Connection

Before the download process can be started, the following steps must be completed (see the *PANELWARE Hardware Installation User's Manual* — GFK-0848 for more information):

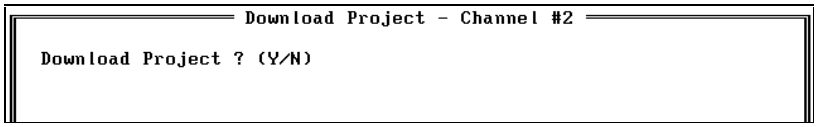
1. Apply power to the Panel by connecting the 24 VDC cable.
2. Connect the PC and the Panel as shown above.
3. Set the operating mode to *Teach-Mode* (operating mode switch to position 7).
4. Press the Reset button on the Panel.

   Wait until the **Teach-Mode** message is displayed on the Panel screen.

Once these steps have been performed, the download process can be started by selecting the **Download** option from the **F3 Utilities** pull-down menu or by pressing **Ctrl** + **X**:

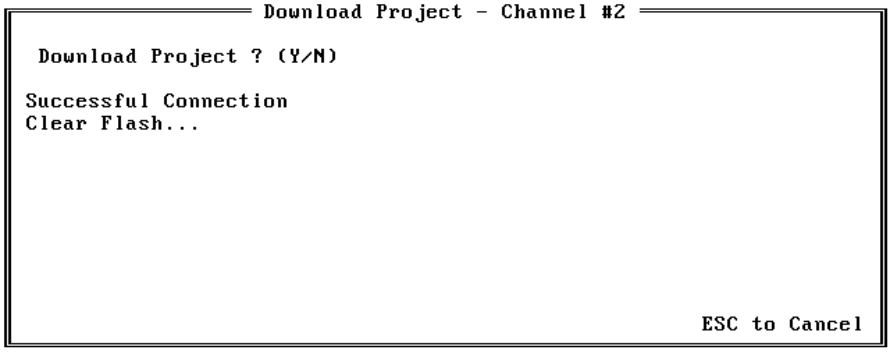


The **Download Project** title and the number of the channel (**Channel #2**) are centered in the top margin of the window that appears on the screen to prompt you to begin the process.

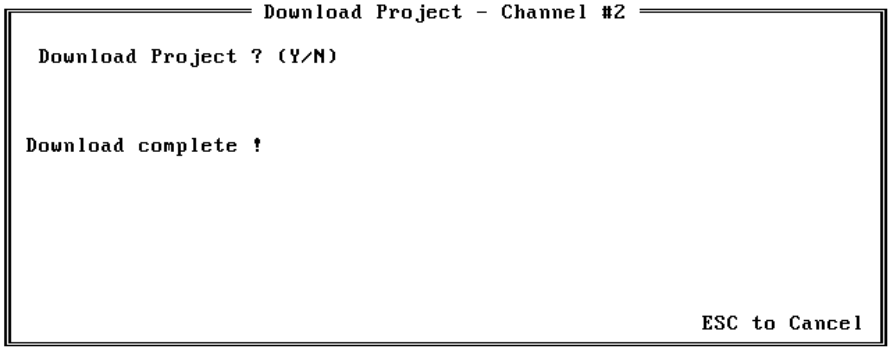


Start the download process by typing ***Y.***

In order to begin the download, PCS tries to make a connection with the Panel. If the connection is successful, the following messages are displayed on the screen:



When the compiled project has been loaded to the Panel successfully, the message "**Download complete!**" is displayed.



Press **Esc** to close the **Download Project** window and return to the **Main** menu.

Connecting the PLC and the Panel

For communication to take place between the Panel and the PLC CPU, the connection in Figure 2-3 must be made. In order for communication to take place between the Panel and the CMM module, the connection in Figure 2-4 must be made. The RS-232 and RS-422 cable specifications are provided in Appendix A.

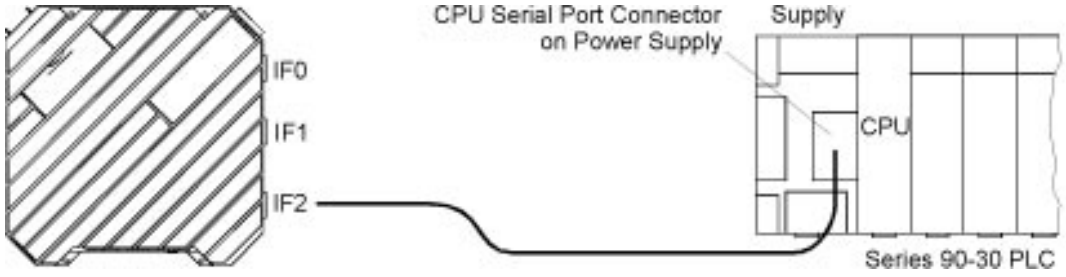


Figure 2 - 3. PLC/Panel Connection

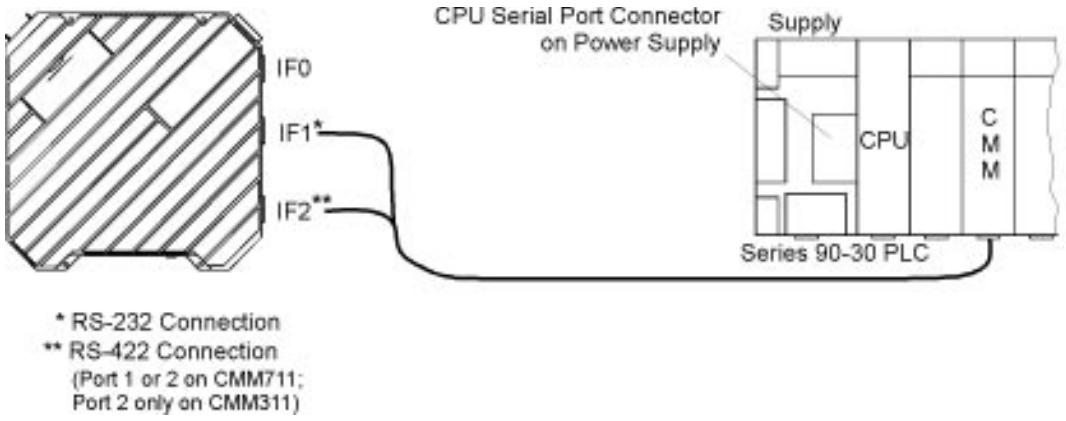


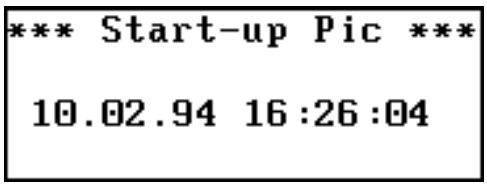
Figure 2 - 4. CMM/Panel Connection

Starting the Project

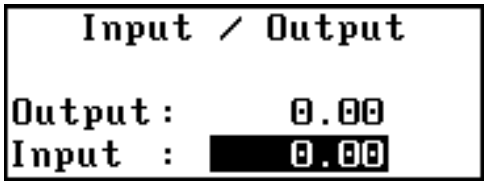
If the project has been downloaded completely, the application can be started after the following steps are completed:

1. Set the operating mode to *Run-Mode* (operating mode switch to position 5).
2. Connect the PLC and the Panel.
3. Press the Reset button on the Panel.

After switching the Panel on or pressing the Reset button, the Start-up picture appears on the screen:

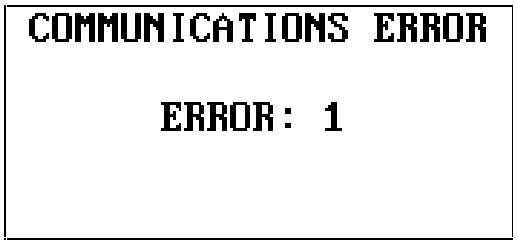


Press the **Next Picture** key on the Panel. The PICT_1 picture will appear on the screen:



The inverse display area is an input field in which values can be entered using the numerical keys (on the numeric Keyblock). After the entry is confirmed by pressing ↵, the value that was entered should appear in the output field above. (See “Key Assignments” in this chapter for individual key descriptions.)

If the connection is not made between the PLC and the Panel, or if it is improperly made (cable defective, wrong interface, etc.), the following message is displayed shortly after the Reset button is pressed:



Error code 1 indicates that a connection cannot be established between the Panel Controller and the PLC.

Exiting PCS

If the **Main** menu is active, PCS program can be ended by pressing the **F10 Exit** function key or by selecting the **Exit** option from the **F1 File** pull-down menu. This causes the following message to appear on the screen.

If you enter ***Y***, PCS program is exited. If you enter ***N***, PCS program is not exited and the **Main** menu remains active.

Caution

If you turn off or reboot your computer before exiting PCS software, clusters will be lost on your hard disk. Lost clusters do not imply that your disk is damaged, only that there is disk capacity that is unused but not managed by the DOS (operating system). This condition may be checked for, and corrected, by using the DOS CHKDSK utility. See your PC's MS-DOS manual for details on running CHKDSK.

Chapter 3 Configuring Communication with the PLC

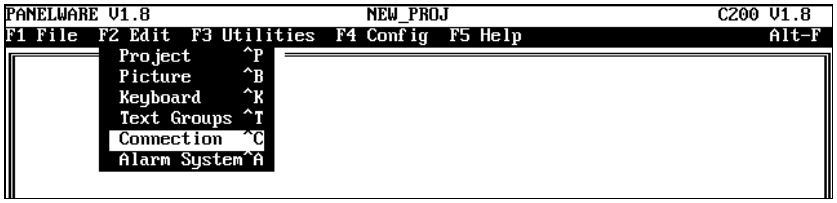
This chapter provides information on how to configure the interfaces of the Panel Controller and the PLC. The following information is included:

- SNP90 Protocol Parameters (Definition in PCS) 3-2
  - Protocol Parameter Definitions 3-3
  - PLC Network Parameter Definitions 3-7
- Settings on the Panel 3-9
- Panel Interface 3-9
- Configuration of the PLC Interface 3-10

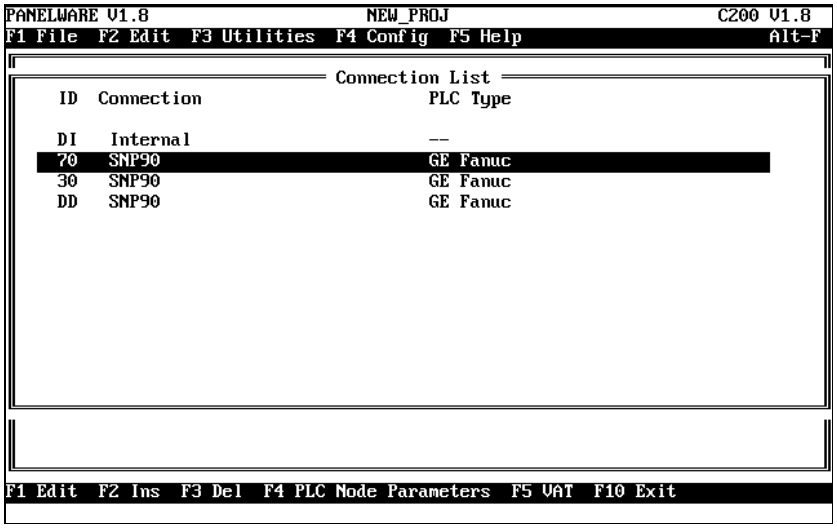
SNP90 Protocol Parameters (Definition in PCS)

The parameter definitions for the interface of a PLC series 90-30 or 90-70 are entered in the connection editor of PCS by accessing the **PLC Node Parameter Definition** and the PLC **Network Parameter Definition** windows and proceeding as follows:

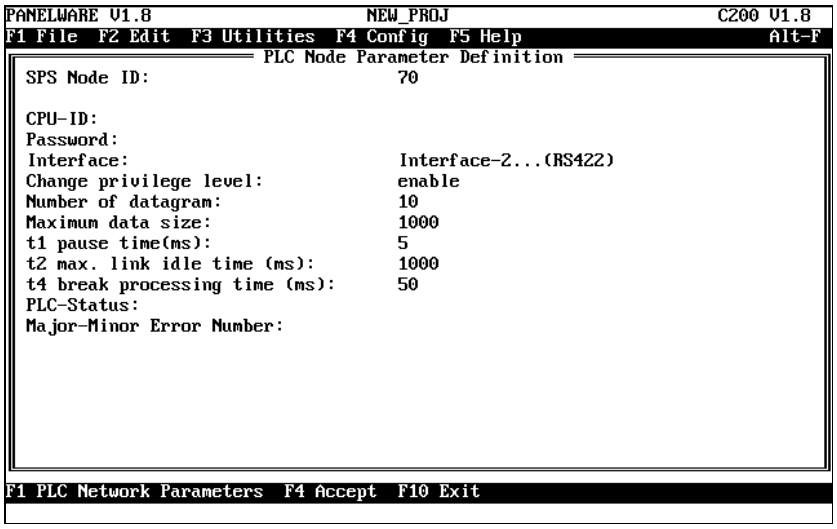
Access the connection list by pressing **Ctrl** + **C** or by selecting the **Connection** option in the **F2 Edit** pull-down menu.



From the **Connection List** window that is displayed, select the connection to be defined for the interface and press the ↵ (Enter) key.


PANELWARE V1.8
NEW_PROJ
C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help
Alt-F
Connection List
ID Connection PLC Type
DI Internal --
70 SNP90 GE Fanuc
30 SNP90 GE Fanuc
DD SNP90 GE Fanuc
F1 Edit F2 Ins F3 Del F4 PLC Node Parameters F5 VAT F10 Exit

Press the **F4 PLC Node Parameters** function key to display the window in which the PLC interface parameters *specific to a connection* can be defined. The following screen shows the default **PLC Node Parameter Definition** settings, which can be used in most cases.



PLC Node Parameter Definitions

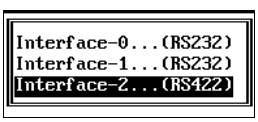
Note

In most instances, the default settings indicated in the window will suffice. Those parameters indicated by an ***** must correspond to the configuration of the PLC interface at the other end. More information can be found in the *Series 90™ PLC Serial Communications Manual* (GFK-0582).

- **CPU-ID***
  The identification code of the CPU that should be accessed by this connection is entered here. This field only needs to be filled in if more than one PLC is multidropped on the Panel's communication network.

- **Password***
  If the *Change privilege level* entry is set to enable (see below), the respective CPU password (if any) should be given here. If any data will be written to the PLC, the Panel must have at least level 2 access rights to the PLC. If level 2 is password protected in the PLC, you must provide the password for level 2, 3, or 4 here *and* set the **Change privilege level** setting to **enable**.

- **Interface***
  Pressing ↵ (Enter) with the cursor on this line opens a selection window in which you can select the interface on the Panel Controller to be used for SNP communications. Note which interfaces support RS-232 and which support RS-422. The proper selection depends on how you intend to connect to the PLC.



- **Change privilege level**
  Pressing ↵ with the cursor on this line opens a selection window in which you can select whether or not access rights to the CPU can be changed:

  - **enable:** Access rights can be changed. In this case, verify whether a password is used or not. If a password is not specified, change the access to the highest unprotected level.
  - **disable:** Access rights can not be changed.

- **Number of datagrams**
  Indicates the maximum number of datagrams. The number of datagrams needed will depend on the amount of data you are obtaining from a PLC. Available PLC CPU memory will limit the number of datagrams that can actually be established.
- **Maximum data size***
  Indicates the maximum number of data bytes in one SNP data message. The maximum that may be selected for a 90-30 CPU is 1000 bytes; for a 90-70 CPU the maximum may be 2048. You may decrease the data size to as low as 40 bytes. Smaller SNP data messages may be useful in an environment where there is noise on the serial link, as more frequent error checking will be possible.
- **t1 pause time (ms.)***
  Indicates the minimum time (in msec) required by the Panel between receiving data and the next transmission. This value should not be set lower than 5ms. Logicmaster 90 uses a default of 10ms.
- **t2 max. link idle time (ms.)***
  Indicates the amount of time (in msec), after sending a message, within which a response must be received from the other end. This value should not be set to less than 1000ms for a 90-30 or 500ms for a 90-70 CPU. Logicmaster 90 uses a default of 3000ms.
- **t4 break processing time (ms.)***
  Indicates the minimum amount of time that the master unit must wait after ending a BREAK sequence before it sends an *Attach Message* or an *Update Real-Time Datagram Message*. This value should not be set to less than 50ms. If a modem is used in the link, this value should be no less than 600ms.

- **PLC-Status**
  Indicates status information from the PLC. In this line, an internal WORD variable[1] can be given, in which status information will be saved. The PLC status value is actually a collection of 12 different status indicators, decoded as shown in Table 3-1.

Table 3 - 1. PLC Status Indicators

PLC States												
15 14 13 12	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
PLC State	NU	Prg chg	OEM prot	Run SW	IO SW	Prg Att	IO flt	PLC flt	IO chg	PLC chg	Con Swp	Ovr Swp

- **PLC State**: Current state (as opposed to switch settings or commanded state). Possible values are:
  0 - RUN_ENABLED
  1 - RUN_DISABLED
  2 - STOP_IO_DISABLED
  3 - CPU_STOP_FAULTED
  4 - CPU_HALTED
  5 - CPU_SUSPENDED
  6 - STOP_IO_ENABLED
- **NU**: Not used (reserved for future expansion).
- **Prg chg**: Program changed flag: 1=Program change; 0=No program change (90-70 release 2.X and later).
- **OEM prot**: OEM protected flag: 1=OEM protection in effect; 0=No OEM protection.
- **Run SW**: Front Panel RUN/STOP switch setting; 1=RUN; 0=STOP.
- **IO SW**: Front Panel ENABLE/DISABLE switch setting; 1=Outputs Disabled; 0=Outputs Enabled.
- **Prg Att**: Programmer Attachment Flag. Shows whether or not there is a programmer attachment in the system. 1=Programmer attachment found; 0=No programmer attachment found.
- **IO flt**: I/O Fault Entry present flag: 1=Fault entry in I/O fault table; 0=I/O fault table is empty.
- **PLC flt**: PLC Fault Entry present flag: 1=Fault entry in PLC fault table; 0=PLC fault table is empty.
- **IO chg**: I/O Fault Entry changed flag: 1=I/O fault table has changed since last read by this device; 0=I/O fault table is the same as when it was last read.
- **PLC chg**: PLC Fault Entry changed flag: 1=PLC fault table has changed since last read by this device; 0=PLC fault table is the same as when it was last read.
- **Con swp**: Constant sweep mode setting: 1=Constant sweep mode enabled for current control program; 0=Constant sweep mode not enabled.
- **Ovr swp**: Oversweep flag (if constant sweep mode enabled). Shows whether the constant sweep value was exceeded on the last sweep. 1=Constant sweep value was exceeded; 0=Normal sweep.

[1] Internal Panel variables are described in the *PANELWARE Configuration Software Reference Manual* (GFK-0849).

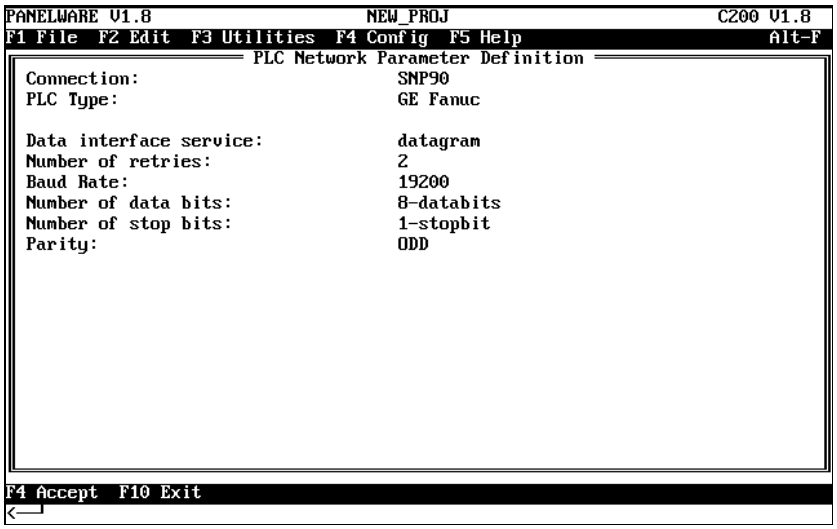
- **Major-Minor Error Number**
  Defines major and minor error numbers. An internal WORD variable[1], in which error information will be saved, can be given in this line. Major or minor error numbers are each one byte in size and are stored in the given WORD variable as listed in Table 3-2.

Table 3 - 2. Major-Minor Error Numbers

WORD Variable	High Byte	Low Byte
Error number	Major error number	Minor error number

PLC Network Parameter Definitions

To access the **PLC Network Parameter Definition** window, press the **F1 PLC Network Parameters** function key. The following screen shows the default **PLC Network Parameter Definition** window settings. The default settings can be used in most cases.



Note

In most instances, the default settings indicated in the window will suffice. Those parameters indicated by an ***** must correspond to the configuration of the PLC interface at the other end. More information can be found in the *Series 90™ PLC Serial Communications User's Manual* (GFK-0582).

- **Data interface service**
  Pressing ↵ with the cursor on this line opens a window in which the method of access to PLC data is defined:

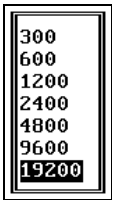
  - **datagram:** Allows data access in *Multiple Point Format*. Reading of data in different data types (WORD, BYTE, BIT and ...) is accomplished by a read instruction.

  - **read_write:** Allows data access in *One Point Format*. Using a read instruction, only data of one type (WORD, BYTE, BIT or ...) is read.

In general, you should always be able to use the **datagram** data interface service; it is the one that will offer the best performance. However, if you are connecting two SNP networks through a 90-30 CMM module (IC693CMM311), you must use the **read_write** data interface service for BOTH connections.

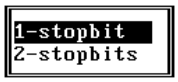
- **Number of retrys**
  Defines the number of times that an SNP message will be sent again after a transmission error.

- **Baud Rate***
  The baud rate can be selected from the following window after ↵ is pressed:



- **Number of data bits***
  The number of data bits can be selected from the following window after ↵ is pressed:

- **Number of stop bits***
  The number of stop bits can be selected from the following window after ↵ is pressed:



- **Parity***
  The parity can be selected from the following window after ↵ is pressed:

Settings on the Panel

A Panel with a Panel Controller can read from and write to a PLC through either an RS-422 or an RS-232 interface. In order to make this possible, the following must take place:

1. A project compiled using PCS is downloaded to the Panel (see “Downloading the Project to a Panel” in Chapter 2).
2. The Panel is operated in Run-Mode (see “Starting a Project” in Chapter 2).

Panel Interface

In order for communication to take place between the Panel and the PLC CPU, the following connection must be made:

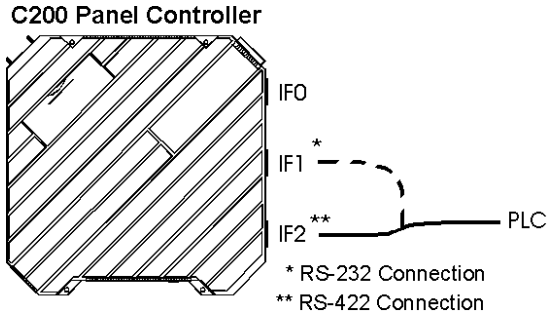
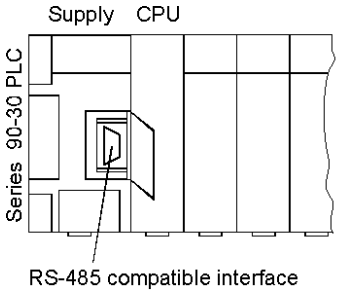
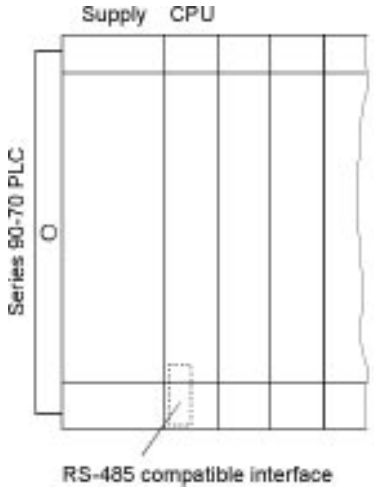


Figure 3 - 1. Panel to PLC Connections

Configuration of the PLC Interface

A PANELWARE Panel can be connected to the Series 90-30 and 90-70 PLC interfaces listed in Table 3-3.

Table 3 - 3. Panel to PLC Interface Connections

Module	Interface
Power supply of the 90-30 or 90-20 series, found on one of the following backplanes: 5-slot backplane with built-in CPU (Model 311) 10-slot backplane with built-in CPU (Model 321) 5-slot backplane with built-in CPU (Model 313) 10-slot backplane with built-in CPU (Model 323) 5-slot backplane with modular CPU (Model 331/340/341/351) 10-slot backplane with modular CPU (Model 331/340/341/351) Series 90 Micro PLC	RS-485-compatible interface 15 pin D-type (F)  **Note:** This interface can not be used unless there is a power supply in the main rack.
All CPUs of the 90-70 series: Processor 80C186: Models 731, 732, 771, 772 Processor 80386DX: Models 780, 781, 782, 788, 789 Processor 80486DX: Models 914, 915, 915, 924, 925	RS-485-compatible interface 15 pin D-type (F) 
CMM module CMM711 (Series 90-70)	RS-232 or RS-485 from Port 1* RS-232 or RS-485 from Port 2*
CMM module CMM311 (Series 90-30)	RS-232 from Port 1* RS-232 or RS-485 from Port 2*

*RS-422-compatible

Caution

If a CMM interface is used for communication with a PANELWARE Panel, it must be operated with *SNP90* protocol

Chapter 4 PCS Connection Editor

This chapter provides a description of the PCS Connection Editor. It includes the following information:

- General Information 4-2
- Accessing the Connection List 4-2
- Elements of the Connection List 4-3
- Using Function Keys in the Connection List 4-4
  - Overview 4-4
  - Editing/Inserting Connections 4-4
  - Deleting Connections 4-5
  - Editing Protocol Parameters of a Connection 4-5
- Editing the Variable Assignment Table (VAT) 4-6
  - Using Function Keys in the VAT 4-6
  - Elements of the VAT 4-7
  - Editing/Inserting Variable Assignments 4-8
  - Deleting Variable Assignments 4-9
  - Marking Unused Variables 4-9
- Data Type Conversions 4-10

General Information

All of the variables (symbolic variable names) that are to be used in a project must be assigned an address in the PLC CPU.

Every PLC connected to the Panel must be entered in the project's connection list. Each of these entries accesses an additional list, the variable assignment table (VAT), in which all variables of a connection are assigned a PLC address (tagname).

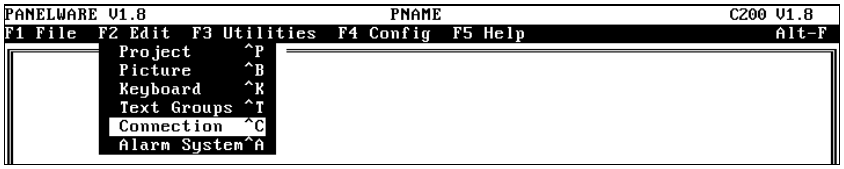
Accessing the Connection List

In order to edit or insert connections, the connection list must be accessed from the Main menu.

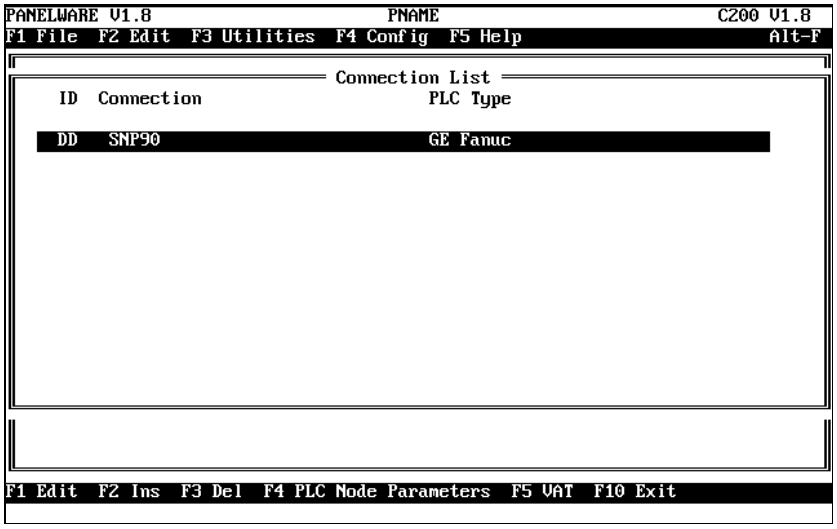
Note

The connection list can only be accessed if a project is loaded.

To access the connection list, select the **Connections** option from the **F2 Edit** pull-down menu, or simply press **Ctrl** + **C**.



The **Connection List** window shown below is displayed:



Elements of the Connection List

A single entry in the connection list consists of the following three segments:

- **ID:** Identification for a connection (PLC station). The assignment of variables to connections is accomplished through the ID. If input or output fields are defined as part of a picture, the PLC address (tagname) must be entered together with the ID (e.g., **`VALUE1/ID`**). Variable names without an ID are automatically assigned the default connection **DD**. An ID consists of one to two alphanumeric characters of your own choosing.
- **Connection:** Type of connection, either **SNP90** or **Internal**:
  - **SNP90:** The connection to the PLC is accomplished over the RS-422 interface (IF2) on the Panel. The GE Fanuc SNP90 protocol is used for the transmission.
  - **Internal:** Internal variables are located within the Panel. A list of these internal variables is provided in the *PANELWARE Configuration Software Reference Manual* (GFK-0849).
- **PLC Type:** Further description of the PLC.

Using Function Keys in the Connection List

Whenever a connection list is displayed, six function keys are active to allow editing, inserting, and deleting of connections, protocol parameters, and the VAT.

Overview

F1 Edit ..... **Editing Connections**
Allows the selected connection to be edited (changed).

F2 Ins ..... **Inserting Connections**
Inserts a new connection into the list.

F3 Del ..... **Deleting Connections**
Deletes the selected connection.

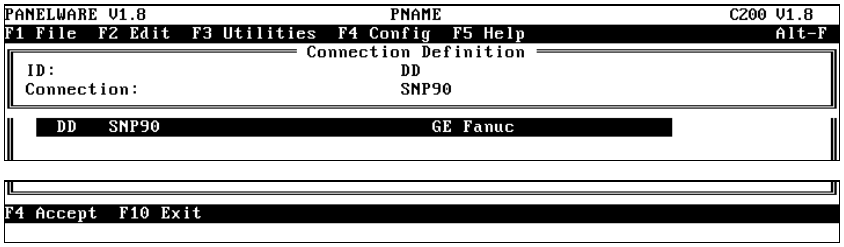
F4 PLC Node Parameters ..... **Editing PLC Node Parameters**
Allows the protocol parameters of the selected connection to be edited.

F5 VAT ..... **Editing Variable Assignment Table (VAT)**
Displays the variable assignment table of the selected connection so that it can be edited.

F10 Exit ..... **Closing the Connection List**
Closes the **Connection List** window and redisplays the Main menu.

Editing/Inserting Connections

When you press **F1 Edit** or **F2 Ins** in the connection list, the following window appears to allow the connection definition to be entered or modified:



F4 Accept .....Saves and then closes the connection definition.

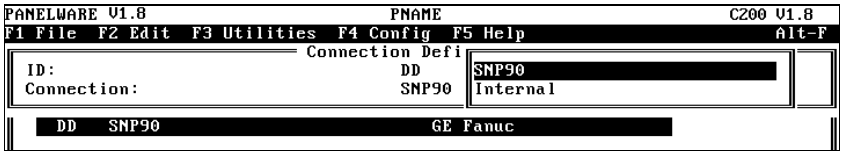
F10 Exit .....Closes the connection definition without saving.

Defining/Changing "ID"

If the cursor is in the **ID** line, the identification code can be changed to any one to two letter-number combination.

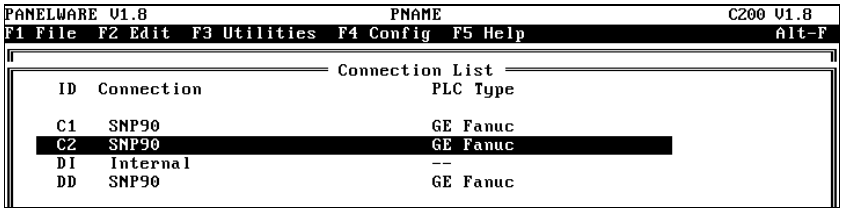
Defining/Changing "Connection"

If the cursor is in the **Connection** line, a selection window can be accessed by pressing the ↵ (Enter) key. You use this window to choose the type of connection required, SNP90 or Internal:



Deleting Connections

Connections can be deleted from the connection list by highlighting the desired connection and pressing the **F3 Del** function key.



After **F3 Del** is pressed, the selected connection disappears from the list.

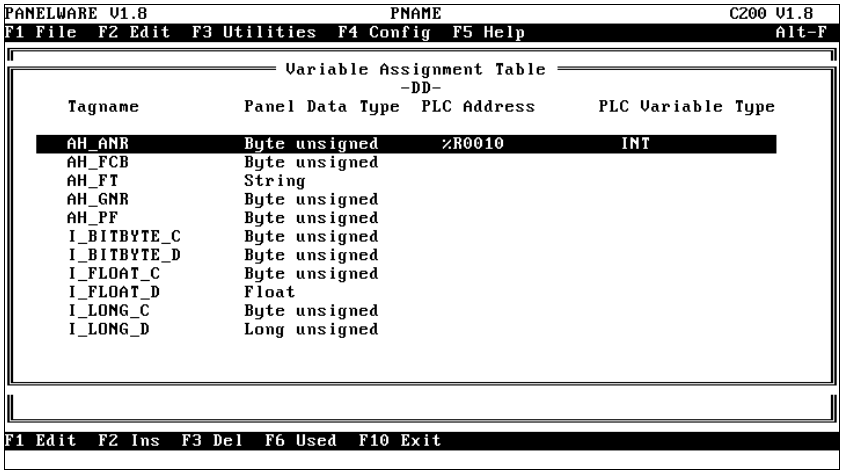
Editing Protocol Parameters of a Connection

The **F4 Protocol Parameters** function key has no effect on **Internal** connections. A more thorough discussion of SNP protocol parameters can be found in the Chapter 3 section entitled "Configuring Communication with the PLC."

Editing the Variable Assignment Table (VAT)

The VAT is used to assign symbolic variables to absolute PLC addresses. All connection variables that are entered as PLC addresses during the project creation are listed in the **Variable Assignment Table.**

When you press the **F5 VAT** key from the connection list, the VAT screen for the selected connection is displayed. The following screen is an example:


PANELWARE V1.8 PNAME C200 V1.8
F1 File F2 Edit F3 Utilities F4 Config F5 Help Alt-F
Variable Assignment Table
-DD-
Tagname Panel Data Type PLC Address PLC Variable Type
AH_ANR Byte unsigned %R0010 INT
AH_FCB Byte unsigned
AH_FT String
AH_GNR Byte unsigned
AH_PF Byte unsigned
I_BITBYTE_C Byte unsigned
I_BITBYTE_D Byte unsigned
I_FLOAT_C Byte unsigned
I_FLOAT_D Float
I_LONG_C Byte unsigned
I_LONG_D Long unsigned
F1 Edit F2 Ins F3 Del F6 Used F10 Exit

Using Function Keys in the VAT

F1 Edit ..... **Editing a variable assignment**
Allows the selected variable assignment to be changed.

F2 Ins ..... **Inserting a variable assignment**
Inserts a new variable assignment.

F3 Del ..... **Deleting a variable assignment**
Deletes the selected variable assignment.

F6 Used ..... **Marking an unused variable**
All variables that are displayed in the VAT but not used in the project can be marked with an ***** character, by pressing **F6**, and then deleted later, using the **F3 Del** function.

F10 Exit ..... **Closing the VAT**
Closes the **Variable Assignment Table** window and redisplays the **Connection list** window on the screen.

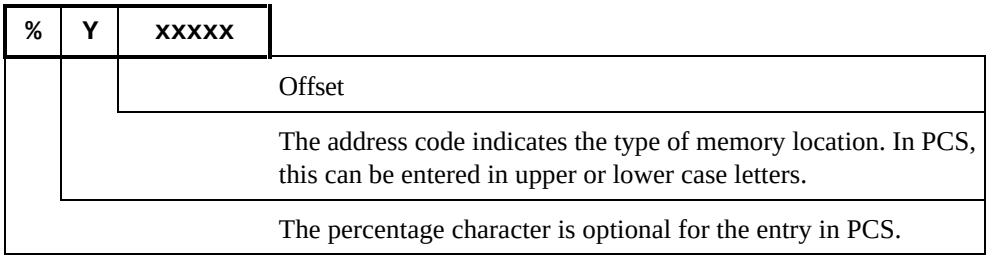
Elements of the VAT

The VAT for any connection consists of the following elements:

- **Tagname**: Symbolic name as follows:
  - Entered for an input or output field as the PLC address with the ID for this connection.
  - Entered for PLC addresses of the alarm system with the ID for this connection (PLC address for the alarm bit field, global alarm or bypass image).
  - Entered for a key command or LED function with the ID for this connection.
  - Entered in the project definition screen with the ID for this connection.
- **Panel Data Type:** Indicates (automatically) the data type of the field that the variable uses (e.g., for Output Byte, *Byte unsigned*). Every field type is assigned a specific Panel data type that cannot be changed by the user.
- **PLC Address:** The PLC address can only be defined for SNP90 connections. You must enter the PLC address using the syntax and format that the connected PLC will understand.

  For a series 90-30 or 90-70 PLC, an address is constructed as shown below:

Example: **%Yxxxxx**


%
Y
xxxxx
Offset
The address code indicates the type of memory location. In PCS, this can be entered in upper or lower case letters.
The percentage character is optional for the entry in PCS.

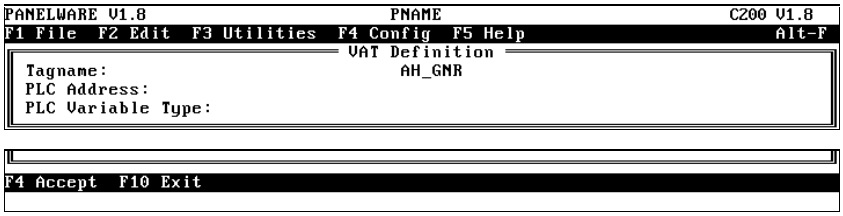
The address `%R0010` could also be entered using the following formats:

```
%R10, %r10, r010, R00010, ...
```

- **PLC Variable Type:** The PLC variable type can only be entered for SNP90 connections. You must enter the variable data type in the PLC (in most cases, it is identical to the Panel data type). For different data types, a data conversion must be performed (automatically). PCS only makes those data types available that the Panel can display or convert for the PLC address (see “Data Type Conversions” in this chapter).

Editing/Inserting Variable Assignments

When you press the **F1 Edit** or **F2 Ins** key from the VAT window, the following window appears to allow a variable assignment to be entered or changed:



Note

Only the Tagname and PLC Address fields may be defined prior to the tagname being referenced somewhere in the project.

F4 Accept .....Saves and closes the VAT definition.

F10 Exit .....Closes the VAT definition without saving it.

Entering/Changing the Tagname

If the cursor is in the **Tagname** line, the symbolic variable name can be changed or entered. Names that are already used in the VAT cannot be used twice and are rejected with the following error message:

```
Variable name already exists!
```

Entering/Changing PLC Addresses

If the cursor is in the **PLC Address** line, the PLC address can be entered or changed using the syntax and format that the connected PLC requires.

Entering/Changing PLC Variable Types

If the cursor is in the **PLC Variable Type** line, a selection window can be opened by pressing ↵ . This window lists the data types that are permitted for this PLC address.

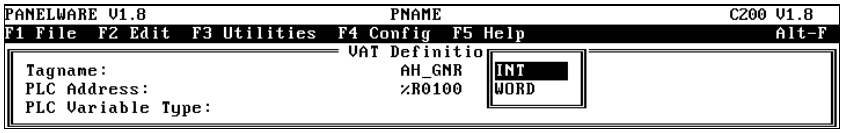


Table 4-1 provides a list of the data types allowed for PLC addresses, depending on the Panel data types and the address codes of the PLC address. Groups 1 and 2 represent the following two different groups of address codes:

Group 1: Address codes %R, %AI, %AQ

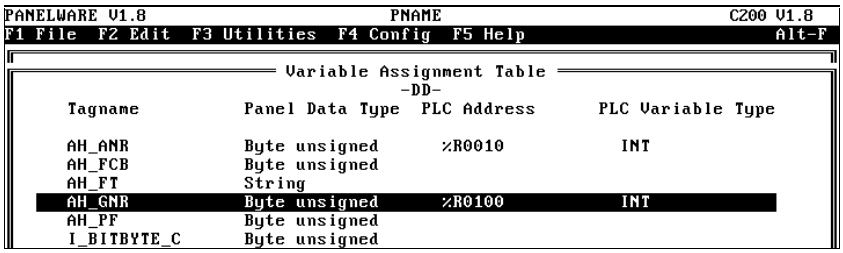
Group 2: Address codes %I, %Q, %T, %M, %G, GA, %GB, %GC, %GD, %GE, %S, %SA, %SB, %SC

Table 4 - 1. Allowable PLC Address Data Types

Panel Data Type (PDT)	PLC Variable Type	
	Group 1	Group 2
Bit	WORD	BIT
Byte unsigned	INT, WORD	BIT, INT, WORD
Word unsigned	INT, WORD, DWORD	BIT, INT, WORD
Word signed	INT, WORD, DINT	INT, WORD
Long unsigned	DWORD, DINT	----
Long signed	DWORD, DINT	----
Float	FLOAT	----
String	STRING	----

Deleting Variable Assignments

Variable assignments can be deleted from the VAT by selecting an entry and pressing the **F3 Del** function key.



After the **F3 Del** key is pressed, the selected variable disappears from the list.

Marking Unused Variables

Variables that are not used in a project but still exist in the VAT can be marked with an ***** character using the **F6 Used** function. These can be deleted later using the **F3 Del** function. To mark all unused variables, simply press the **F6** function key.

Caution

The *F6 Used* function only provides valid information after a successful compilation.

Data Type Conversions

The following basic Panel and PLC data types are supported:

Table 4 - 2. Variable Data Types (Panel vs PLC)

Format in PCS		
Panel Data Type	**PLC Data Type**	**Value Range**
Bit	BIT	0 ... 1
Byte unsigned	(does not exist)	0 ... + 255
Word unsigned	WORD	0 ... + 65535
Word signed	INT	- 32768 ... + 32767
Long unsigned	DWORD	0 ... + 4294967295
Long signed	DINT	- 2147483648 ... + 2147483647
Float	FLOAT	$- 3.402823 \times 10^{+38} \cdots + 3.402823 \times 10^{+38}$* $- 1.401298 \times 10^{-45} \cdots + 1.401298 \times 10^{-45}$*
String	STRING	Byte field (character string)

* A maximum of 7 digits of significance (precision).

The PLC data types and the Panel can sometimes differ while reading from the PLC or writing to the PLC. When this happens, a data type conversion is performed automatically, as listed in Table 4-3.

Table 4 - 3. Data Type Conversions (Panel Data Type/PLC)

Legend:

Byte u. .....Byte unsigned

Word u. .....Word unsigned

Word s. .....Word signed

Long u. .....Long unsigned

LSB .....Least Significant Bit (Lower Bit)

MSB .....Most Significant Bit (Upper Bit)

LOB .....Low Order Byte (Lower Byte)

HOB.....High Order Byte (Upper Byte)

PDT.....Panel Data Type

PDT		Data Type Conversion		PLC
Bit	→	No conversion.	→	BIT
	←	No conversion.	←	
Bit	→	The value of Bit is copied to the LSB of WORD. The rest of the bits of WORD are set to 0.	→	WORD *
	←	Values higher than 1 are limited to 1.	←	
Byte u.	→	The LSB of Byte u. is copied to BIT.	→	BIT
	←	The value of BIT is copied to the LSB of Byte u. The rest of the bits of Byte u. are set to 0.	←	
Byte u.	→	Byte u. is copied to the LOB of WORD. The HOB of WORD is set to 00.	→	WORD *
	←	Values higher than 255 are limited to 255.	←	
Byte u.	→	Byte u. is copied to the LOB of INT. The HOB of INT is set to 0.	→	INT *
	←	Values higher than 255 are limited to 255. Negative values are limited to 0.	←	

PDT		Data Type Conversion		PLC
Word u.	→	The LSB of Word u. is copied to BIT.	→	BIT
	←	The value of BIT is copied to the LSB of Word u. The rest of the bits of Word u. are set to 0.	←	
Word u.	→	No conversion.	→	WORD *
	←	No conversion.	←	
Word u.	→	Values higher than 32767 are limited to 32767.	→	INT *
	←	Negative values are limited to 0.	←	
Word u.	→	Word u. is copied to the lower word of DWORD. The upper word is set to 0.	→	DWORD
	←	Values higher than 65535 are limited to 65535.	←	
Word s.	→	Negative values are limited to 0.	→	WORD *
	←	Values higher than 32767 are limited to 32767.	←	
Word s.	→	No conversion.	→	INT *
	←	No conversion.	←	

Table 4 - 3. - Continued

Word s.	→	Word s. is copied to the lower word. For a negative value, the upper word is filled with FFFF (hexadecimal). For a positive value, the upper word is filled with 0.	→	DINT
	←	Values higher than 32767 are limited to 32767. Values lower than -32768 are limited to -32768.	←	
Long u.	→	No conversion.	→	DWORD
	←	No conversion.	←	
Long u.	→	Values higher than 2147483647 are limited to 2147483647. Values lower than -2147483648 are limited to -2147483648.	→	DINT
	←	Negative values are limited to 0.	←	
Long s.	→	Negative values are limited to 0.	→	DWORD
	←	Values higher than 2147483647 are limited to 2147483647.	←	
Long s.	→	No conversion.	→	DINT
	←	No conversion.	←	
Float	→	No conversion.	→	FLOAT
	←	No conversion.	←	
String	→	For odd string lengths, a null byte is added to the end.	→	STRING
	←	No conversion.	←	

- * For PLC addresses in group 2 (%I, %Q, %T, %M, %G, %GA, %GB, %GC, %GD, %GE, %S, %SA, %SB, %SC), ensure that the offset of the address meets the following condition:

  (Offset - 1) must be 0 or a multiple of 8!

Table 4-4 provides another view of the permitted combinations of Panel data types and PLC data types. The address codes and possible limitations on the offset are listed for the PLC data types.

Table 4 - 4. Possible Data Type Conversions

Panel Data Types	PLC Data Types						
	BIT	**WORD**	**INT**	**DWORD**	**DINT**	**FLOAT**	**STRING**
Bit	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0	R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0					
Byte u.	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE	R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0	R, AI, AQ, , Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0				
Word u.	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE	R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0	R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0	R, AI, AQ			
Word s.		R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0	R, AI, AQ, I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE (offset-1)%8=0		R, AI, AQ		
Long u.				R, AI, AQ	R, AI, AQ		
Long s.				R, AI, AQ	R, AI, AQ		
Float						R, AI, AQ	
String							R, AI, AQ

Note

The statement (offset - 1)%8 calculates the modulo (remainder) of the division from (offset – 1)/8. This calculation ensures that the address is on a byte boundary (address – 1 is a multiple of 8).

Chapter 5 Demo Project

This chapter provides a description of the demo project that is delivered with PCS. It includes the following sections of information:

- General Information 5-1
- Required Hardware 5-2
- Loading the Demo Project 5-3
  - Defining the User Path 5-3
  - Loading the Project 5-3
  - Downloading and Starting the Project 5-4
- Using the Demo Project 5-5
  - General Information 5-5
  - Main Menu 5-6
  - Value Entries 5-7
  - Entering a Password 5-9
  - Key Functions 5-11
  - Alarm List 5-12
  - Error Picture 5-13

General Information

A demo project that provides an overview of the software's functionality and demonstrates PANELWARE's capabilities is included with PCS. The project, which has the filename DEMO_200.PRD, is copied onto the hard disk during the software installation to directory path **`destination path\USER\`**. (An additional project, DEMO_300.PRD, which is included on the disk, is not used and can be deleted.)

Required Hardware

The demo project requires the following minimum hardware in order to actually execute (see the *PANELWARE Hardware Installation User's Manual* — GFK-0848):

- one Panel Controller C200
- one 8 x 40 LCD display module
- one numeric (12+4) Keyblock module
- one 16-key Keyblock module
- one connection cable between the PC and the Panel
- one connection cable between the PC and the PLC

Assemble the modules according to the instructions in the *PANELWARE Hardware Installation User's Manual* (GFK-0848). Be sure to attach the numeric Keyblock module as the first of the two Keyblocks, connecting it to the Panel Controller. The assembled Panel should look like Figure 5-1.

Note

Your numeric Keyblock module may not have the E and C keys. Instead, the E key (ENTER) may be the ↵ key symbol and the C key (CLEAR) may be the ← symbol.

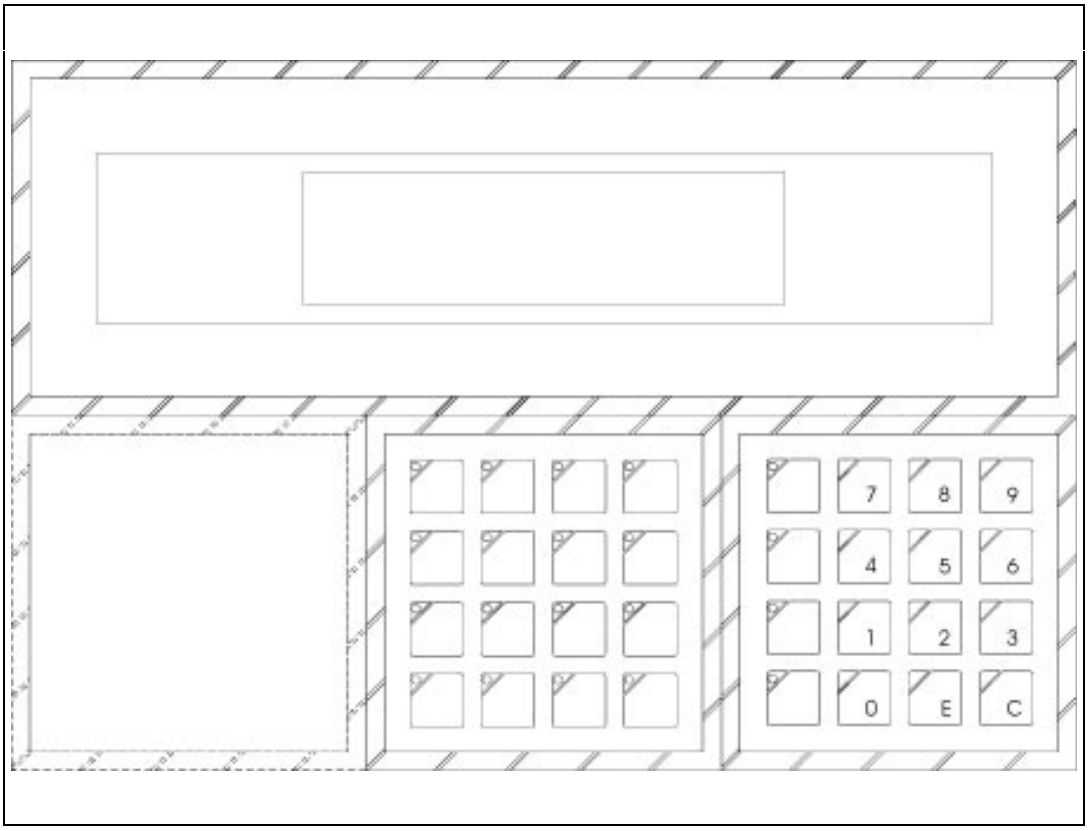


Figure 5 - 1. Demo Project Hardware Configuration

Loading the Demo Project

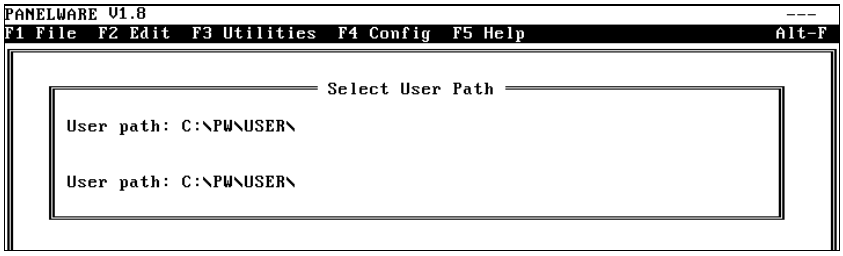
The following sections describe how to load and start the demo project.

Defining the User Path

In order to load the demo project to PCS, you must ensure that the user path is defined as **`destination path\USER`**. (The proper default user path was set by the installation program when you installed the software (e.g., **C:\PW\USER**).

To set up the correct user path, open the **F4 Config** pull-down menu from the **Main** menu and select the **User Path** option:

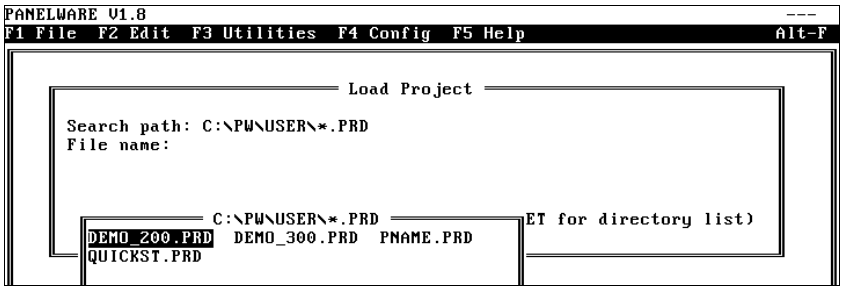
The **Select User Path** window that is displayed allows you to change the user path:



If the user path is changed after the installation, enter the path **`destination path\USER\`** here.

Loading the Project

In order to load the DEMO project, select the **Open Project** option from the **F1 File** pull-down menu and press the ↵ (Enter) key to access the selection window containing the list of current projects. Highlight the desired DEMO project and press ↵ to select/open it.



After the project has been selected, the **Edit Project** window is displayed. To close this window, press the **F10 Exit** key or **Esc**.

Downloading and Starting the Project

Download the project to the Panel by following the steps outlined in the following sections, first at the Panel, then in PCS, then at the Panel again:

At the Panel:

1. Supply the Panel with power by connecting the 24 VDC power.
2. Set the operation mode to *Teach Mode* (operation mode switch in position 7).
3. Press the Reset button on the Panel.

   Wait until the **Teach-Mode** message appears on the Panel display.
4. Connect the Panel to the PC.

In PCS:

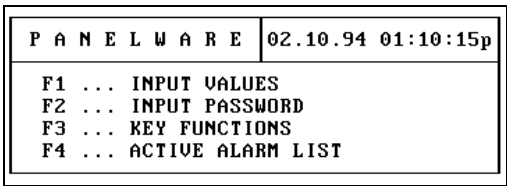
5. Press **Ctrl** + **X** simultaneously.

   The question "**`Download Project? (Y/N)`**" is displayed on the screen.
6. Start the download process by pressing the ***`Y`*** key.

   Wait until the "**`Download Complete!`**" message is displayed on the screen.

At the Panel:

7. Connect the Panel and the PLC (interface with SNP90 protocol).
8. Set the operation mode to *Run Mode* (operation mode switch in position 5).
9. Press the Reset button on the Panel. The following start-up picture is displayed on the Panel screen to indicate that the project has been downloaded and started:



Using the Demo Project

The following sections explain how to use the DEMO project, one screen/picture at a time.

General Information

The following symbols are used throughout the DEMO project description to indicate blinking or illuminated LEDs on the Keyblock modules:

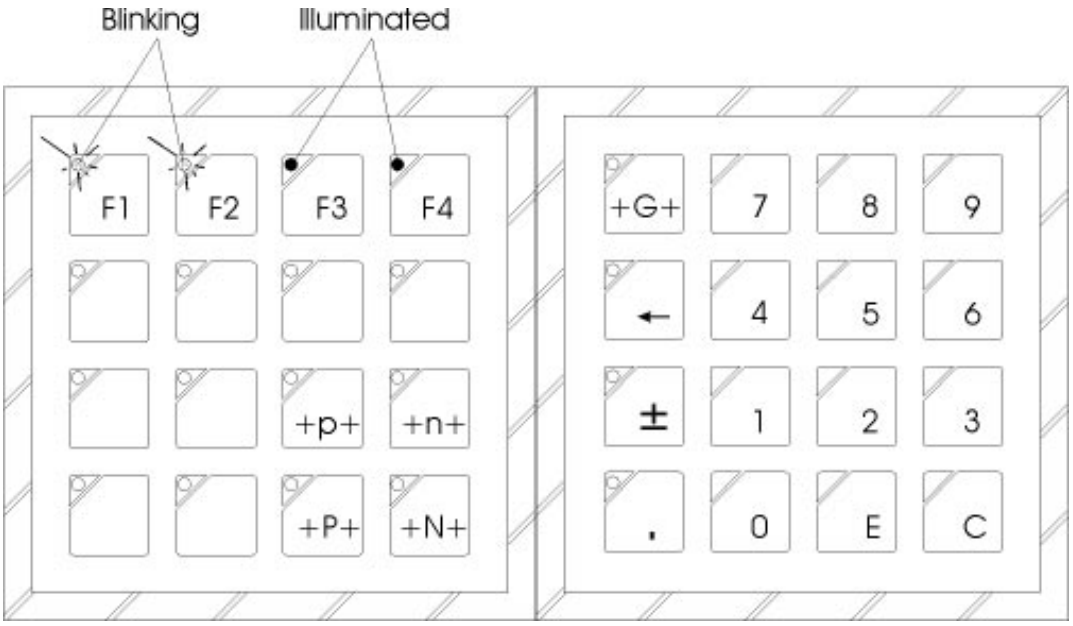


Figure 5 - 2. Example of Blinking and Illuminated LEDs

Keys:

F1 ... **F4**	Function keys 1 to 4 (function depends on the current picture)
+p+/**+n+**	Cursor to previous/next INPUT field
+P+/**+N+**	Change to previous/next picture
+G+	Global acknowledgment for alarm
0 ... **9**	Numbers 0 to 9
.	Decimal point
←	If the cursor is in an INPUT field, deletes the last character entered
±	Changes the sign for a numerical INPUT field
↵ or **E**	Confirms the entry in an INPUT field
← or **C**	Clears the entry in an INPUT field

Key LEDs:

In every picture, function keys are assigned different functions. The LEDs of the Keyblock module keys that have functions assigned to them are either illuminated or blinking.

Note

The numeric Keyblock module shown throughout the following sections may not look like yours, which may not have the E and C keys. Instead, the E key (ENTER) may be the ↵ symbol and the C key (CLEAR) may be the ← symbol.

Main Menu

If the project has been properly downloaded to the Panel and you have started the Panel in *Run Mode*, the DEMO project's **Main** menu appears (this is the same as the start-up picture):

```
P A N E L W A R E | 02.10.94 01:10:15p

  F1 ... INPUT VALUES
  F2 ... INPUT PASSWORD
  F3 ... KEY FUNCTIONS
  F4 ... ACTIVE ALARM LIST
```

The date and time are displayed in the top right-hand corner of the menu. The **F1** to **F4** entries provide information on the functions assigned to keys **F1** to **F4**. These key LEDs (**F1** through **F4**) are illuminated on the Keyblock module as well, as shown below:

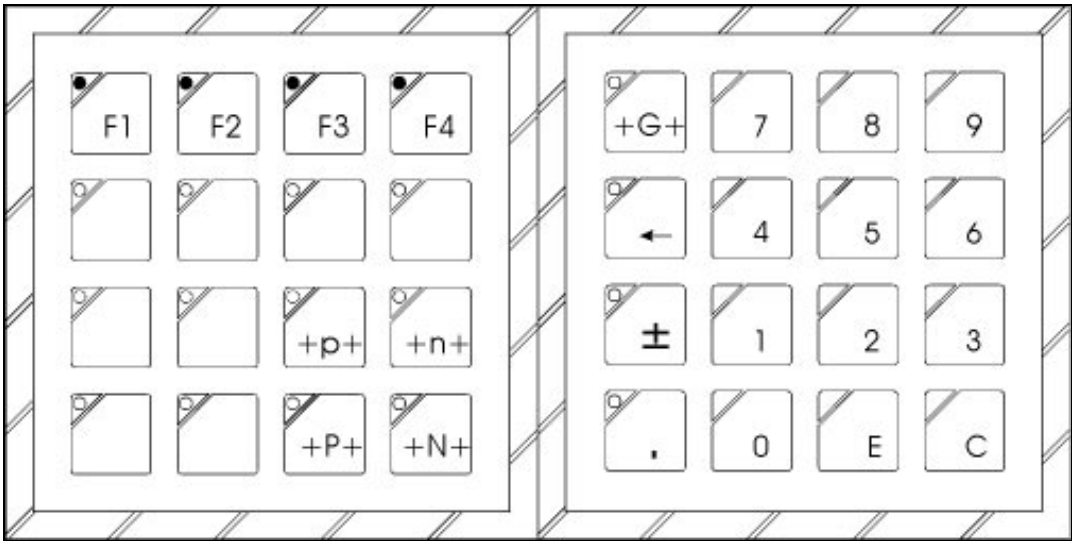


Figure 5 - 3. Demo Project Main Menu LED Configuration

Function keys **F1** to **F4** are used by the system operator to switch between the following pictures:

F1 Changes to the **INPUT VALUES** picture. Two different types of values can be entered/changed; these are then output to two output fields.

F2 Changes to the **INPUT PASSWORD** picture. Entering a password and its functions is done in this picture.

F3 Changes to the **KEY FUNCTIONS** picture. The keys can be assigned specific functions so that locations in the PLC memory can be influenced immediately.

F4 Changes to the **ACTIVE ALARM LIST** picture. Displays a list of all active alarms.

Value Entries

The following sections outline how to use those pictures that require value inputs.

INPUT VALUES Picture

If you press the **F1 INPUT VALUES** function key while in the **Main** menu, the INPUT VALUES picture appears on the Panel display:

```
                INPUT VALUES

  %R0001=    15  (+/- with F1/F2)
  %R0002=   123  (use numerical keypad)

OUTPUT VALUES:
  %R0001=  00114
  %R0002=  00123   F3:SET CLOCK  F4:MENU
```

Key LEDs:

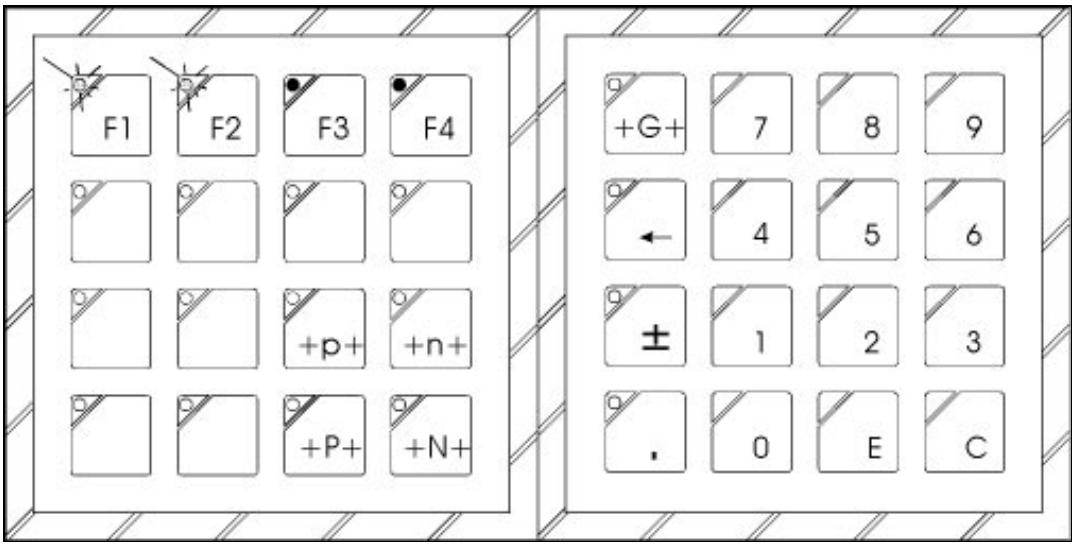


Figure 5 - 4. Demo Project Input Values Picture LED Configuration

Keys **F1/F2** increase/decrease the value of the PLC variable %R0001 as follows:

F1 increases the value by 1 initially, then at greater increments the longer the key is depressed

F2 decreases the value by 1 initially, then at greater increments the longer the key is depressed

The value of PLC variable %R0002 can be changed directly by entering a value using the numerical keys. Keys **+p+** and **+n+** switch between the two INPUT fields.

The contents of both PLC variables are displayed in two OUTPUT fields with preceding zeros (five digits of significance).

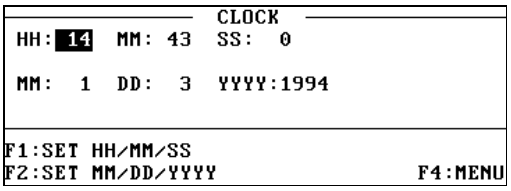
Keys **F3** and **F4** allow switching to the following pictures:

F3 Changes to the **CLOCK** picture
This picture is used for entering/changing the date and time on the Panel.

F4 Changes back to the **Main** menu

CLOCK Picture

If you press **F3** while in the INPUT VALUES picture, the CLOCK picture appears on the Panel display:



Key LEDs:

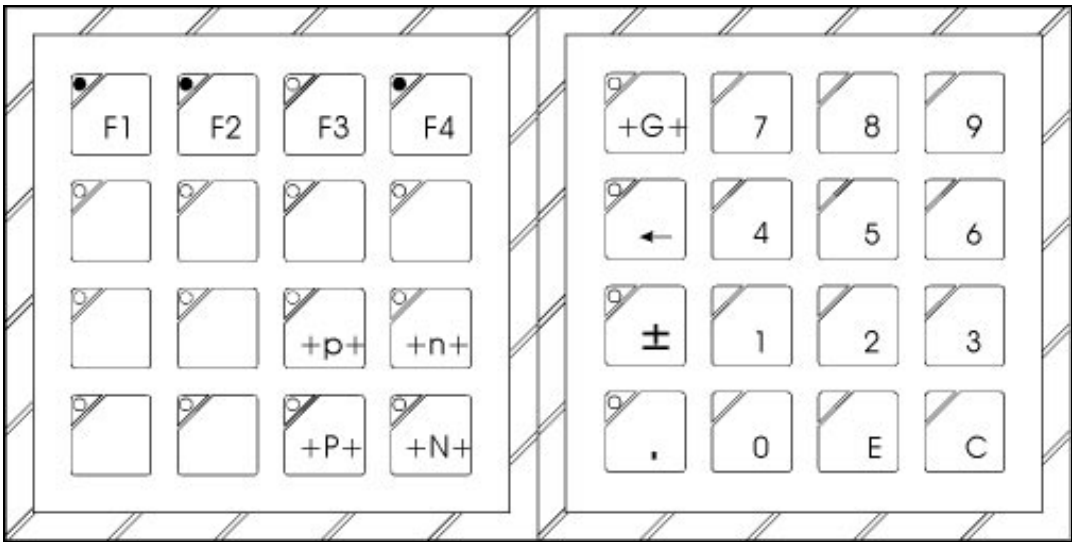


Figure 5 - 5. Demo Project Clock Picture LED Configuration

To change the date and time, enter the desired data in the INPUT fields, using the **+p+** and **+n+** keys to switch between the fields. Setting the internal clock time or date is done using the following two function keys:

F1 The internal clock time of the Panel is set to the values corresponding to HH (Hours), MM (Minutes), and SS (Seconds).

F2 The internal date of the Panel is set to values entered for MM (Month), DD (Day), and YYYY (Year).

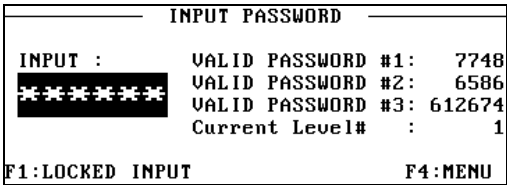
Pressing the **F4** function key returns you to the **Main** menu.

Entering a Password

The following sections outline how to use those pictures that use passwords and locked input.

INPUT PASSWORD Picture

If you press the **F2** function key (INPUT PASSWORD) while in the **Main** menu, the INPUT PASSWORD picture appears on the Panel display:



Key LEDs:

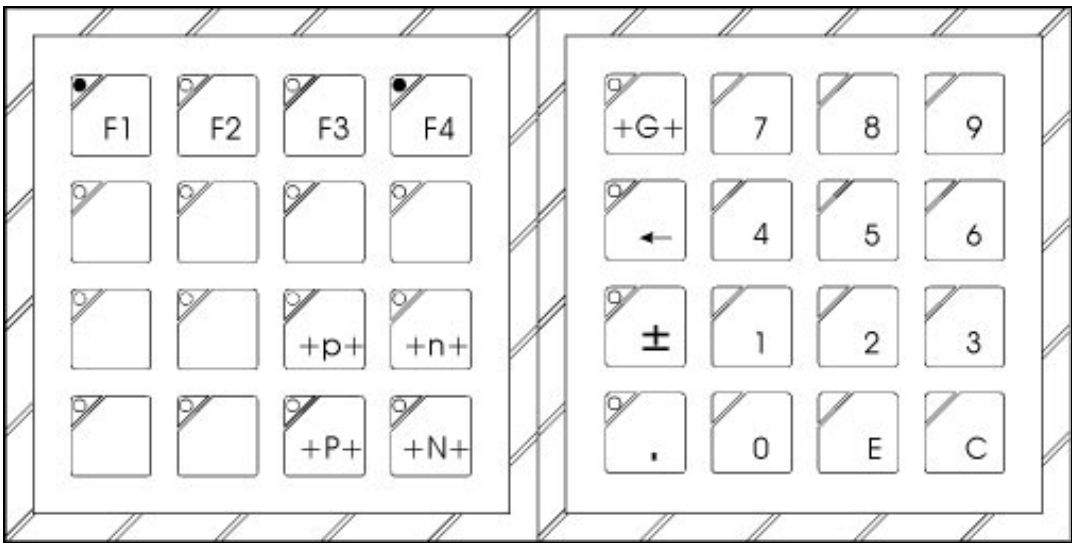


Figure 5 - 6. Demo Project Input Password Picture LED Configuration

This picture allows you to enter the password(s) that will allow you to change locked input fields. Entering a password switches you to a different password level that changes the access rights of different functions.

Keys **F1** and **F4** are used to change to the following pictures:

F1 Changes to the **LOCKED INPUT** picture
Certain values can be changed via this picture depending on the password level.

F4 Changes back to the **Main** menu

LOCKED INPUT Picture

If you press the **F1** function key while in the INPUT PASSWORD picture, the LOCKED INPUT picture appears on the Panel display:

```
INPUT FIELDS ARE LOCKED DEPENDING ON THE
CURRENT PASSWORD LEVEL

INPUT #1:    9   (LOCKED IF PASSWORD
                  NOT VALID)
INPUT #2:   100  (LOCKED IF LEVEL < 3)

F1:PASSWORD                      F4:MENU
```

Keys LEDs:

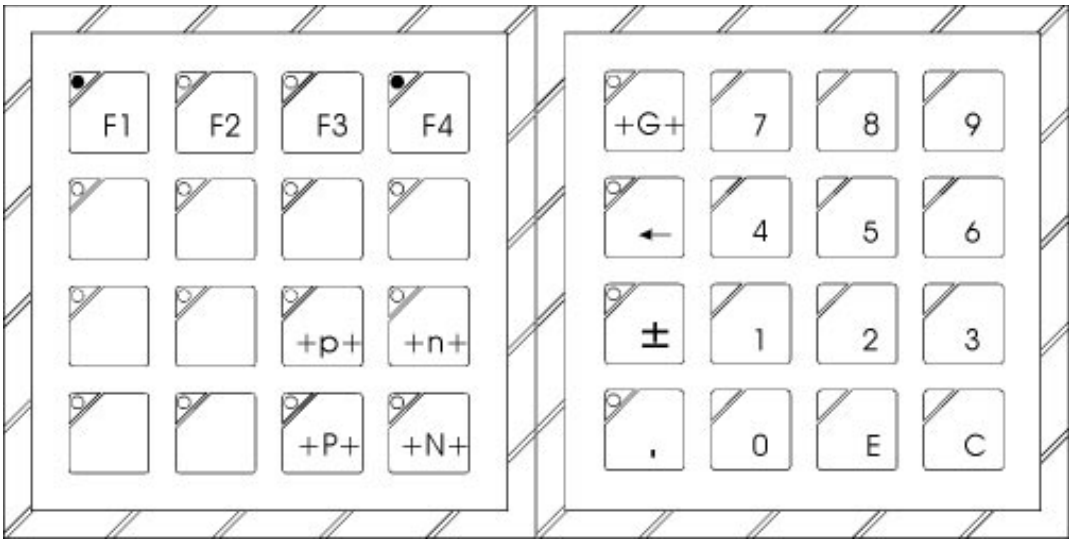


Figure 5 - 7. Demo Project Locked Input Picture LED Configuration

If you entered an invalid password in the INPUT PASSWORD picture, the value for INPUT #1 cannot be changed. You can change the value for INPUT #2 if you entered the valid password for password level 3.

Keys **+p+** and **+n+** are used to switch to the other input field (if you have accessed the proper password level).

Keys **F1** and **F4** are used to change to the following pictures:

F1 Changes back to the **INPUT PASSWORD** picture
Entering a password and its function is performed in this picture.

F4 Changes back to the **Main** menu

Key Functions

If you press the **F3 KEY FUNCTIONS** function key while in the **Main** menu, the KEY FUNCTIONS picture appears on the Panel display:

```
KEY FUNCTIONS

F1:SET WORD:     %R0005=    23  (10000)
F2:TOGGLE WORD:  %R0006=     0  (0/20000)
F3:MOM. BYTE:    %R0007=     0  (111)

                                F4:MENU
```

Key LEDs:

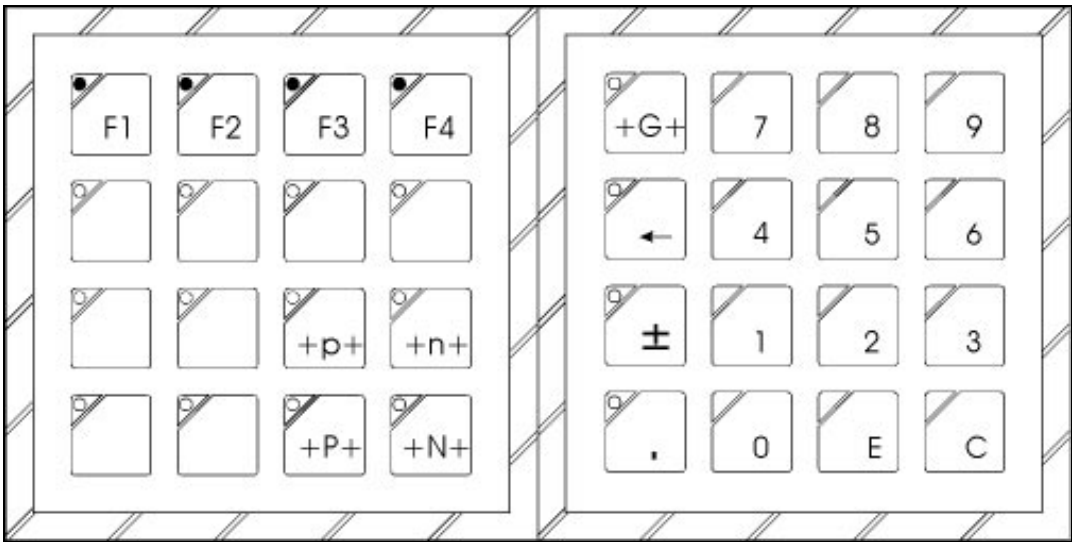


Figure 5 - 8. Demo Project Key Functions LED Configuration

Keys **F1** to **F4** are assigned to specific functions, i.e., when they are pressed, variables in the PLC are changed directly as follows:

F1 PLC variable %R0005 is assigned a value of 10000.

F2 PLC variable %R0006 is toggled between the two values 0 and 20000 as the key is pressed.

F3 PLC variable %R0007 is overwritten with a value of 111 as long as the key is held down. When the key is released, a value of 0 is written to the variable.

F4 Changes back to the **Main** menu.

Alarm List

If you press the **F4 ACTIVE ALARM LIST** function key while in the **Main** menu, the ACTIVE ALARM LIST picture appears on the Panel display:

```
ACTIVE ALARM LIST        %M001=ALARM #1
                         %M016=ALARM #16
02:34:28p  11 Alarmtext #11            R0
01:23:59p  04 Alarmtext #4             A0
No Alarm
No Alarm

F1:QUIT ALARM   F2:UP   F3:DOWN  F4:MENU
```

Key LEDs:

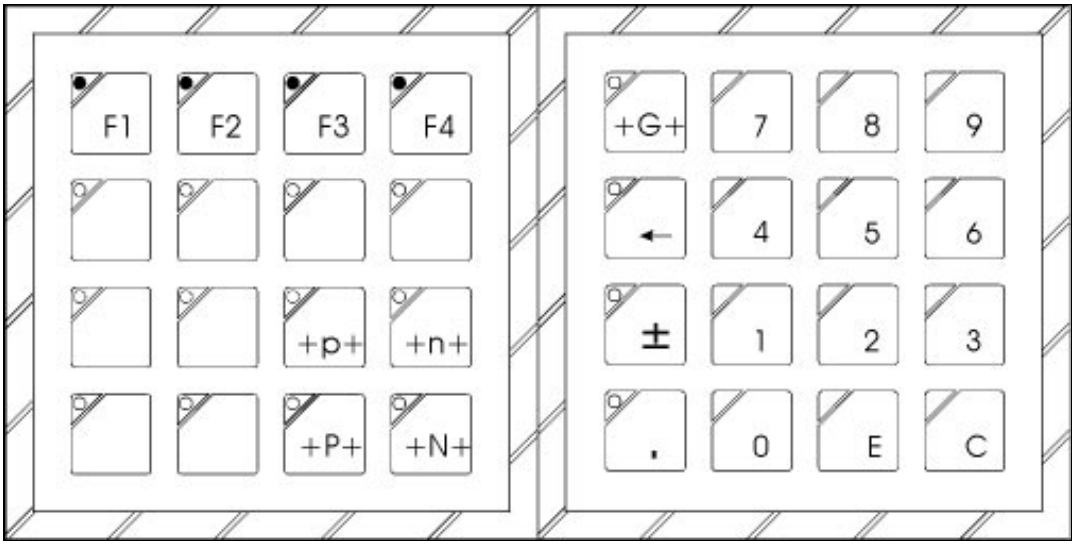


Figure 5 - 9. Demo Project Active Alarm List Picture LED Configuration

The ACTIVE ALARM LIST displays alarms according to the alarm bit field (memory locations %M001 to %M016 in the PLC). If %M001 in the PLC changes from 0 to 1, alarm 1 is entered in the alarm list. An alarm entry contains the following information:

- **Alarm time** Time when the alarm occurred
- **Alarm number** Number of the alarm (corresponds to the bit number of the alarm field)
- **Alarm text** Short description of the alarm
- **Information** Information about the type of alarm
- **Priority** Priority of the alarm

A detailed description is provided in the *PANELWARE Configuration Software Reference Manual* (GFK 0849).

Keys **F1** through **F4** are assigned the following functions:

F1 Acknowledges the selected alarm.

F2/F3 Scrolls through the alarms in the alarm list (**F2**=Up; **F3**=Down). Scrolling through the list selects an alarm (inverse display), which can be acknowledged using the **F1** key.

F4 Changes back to the **Main** menu.

Error Picture

If the connection between the Panel and the PLC is disrupted or interrupted for any reason, the following ERROR picture appears on the Panel display:

```
Error-Picture
This screen appears on a
communication error.
Please verify that the communication
cable is connected to the PLC-SNP port
and to port 2 of the panel.
Error:   1 at ********** / DD
```

Key LEDs:

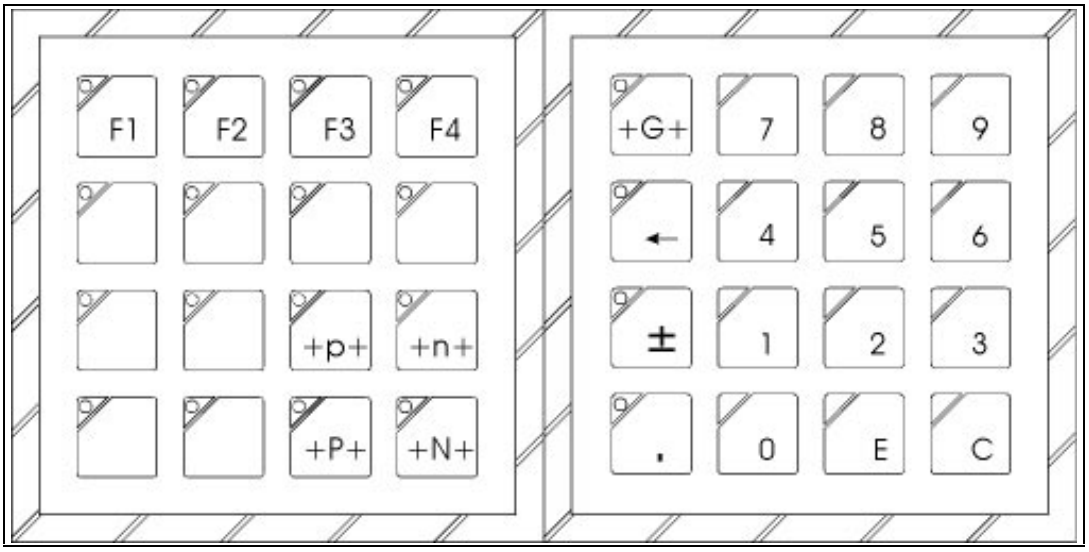


Figure 5 - 10. Demo Project Error Picture LED Configuration

Information about any error that occurs is displayed in this picture.

Note

To simulate an error, simply unplug the cable between the Panel and the PLC and the ERROR picture will be displayed.

More detailed information about error numbers and text is located in the *PANELWARE Configuration Software Reference Manual*.

Caution

If the Main menu is active, the ERROR picture will not be displayed if the connection between the Panel and the PLC is disrupted. The ERROR picture will only be displayed if the picture is changed to one containing fields that should be displaying values from the PLC.

Appendix

A

Cabling Information

This appendix describes and illustrates the required PCS to PLC/PC interface cabling. It includes the following information:

- Cable and Connector Specifications A-2
- PANELWARE Panel to CPU Series 90 ..... A-3
- PANELWARE Panel to CMM Module Series 90 ..... A-5
- Cable Diagrams A-6

Cable and Connector Specifications

The cable assembly presents one of the most common causes of communication failure. For best performance, construct the cable assemblies using the recommended connector parts and according to these specifications.

Table A - 1. Connector/Cable Specifications

Item	Description
Connectors	**Series 90 PLC**: Connector: 15-pin male, D-subminiature type, Cannon DA15S, or equivalent Hood: AMP 207470-1 connector shell, or equivalent Hardware Kit: AMP 207871-1 (Includes two metric screws and two screw clips)
	Series 90 CMM: Connector: 25-pin male, D-subminiature type, Cannon DB25P, or equivalent Hood: Cannon DB110963-3 connector shell, or equivalent
	PANELWARE Panel Controller: Connector: 9-pin male, D-subminiature type, AMP 205204-1, or equivalent Hood: AMP 207908-1 connector shell, or equivalent
Cable	**Caution** **All connected devices must be grounded to a common point. Failure to do so could result in damage to the equipment.** **Type:** Computer grade, 24 AWG (min.) with overall shield. **Catalog Numbers:** Belden 9505, Belden 9306. Belden 9832 **Maximum lengths**: RS-232 50 feet (15 meters) RS-422 4000 feet (1200 meters) At shorter distances — under 50 feet (15 meters) — almost any twisted pair or shielded twisted pair cable will work, as long as the wire pairs are connected correctly. When using RS-422, the twisted pairs should be matched so that one twisted pair carries both transmit signals and the other twisted pair carries both receive signals. If this is ignored, cross-talk resulting form the mismatching will affect the performance of the communications system. When routing communication cables outdoors, transient suppression devices can be used to reduce the possibility of damage due to lightning or static discharge.

PANELWARE Panel to Series 90 CPU

The connection diagrams presented in Figures A-1 and A-2 illustrate Panel connections to a Series 90 CPU.

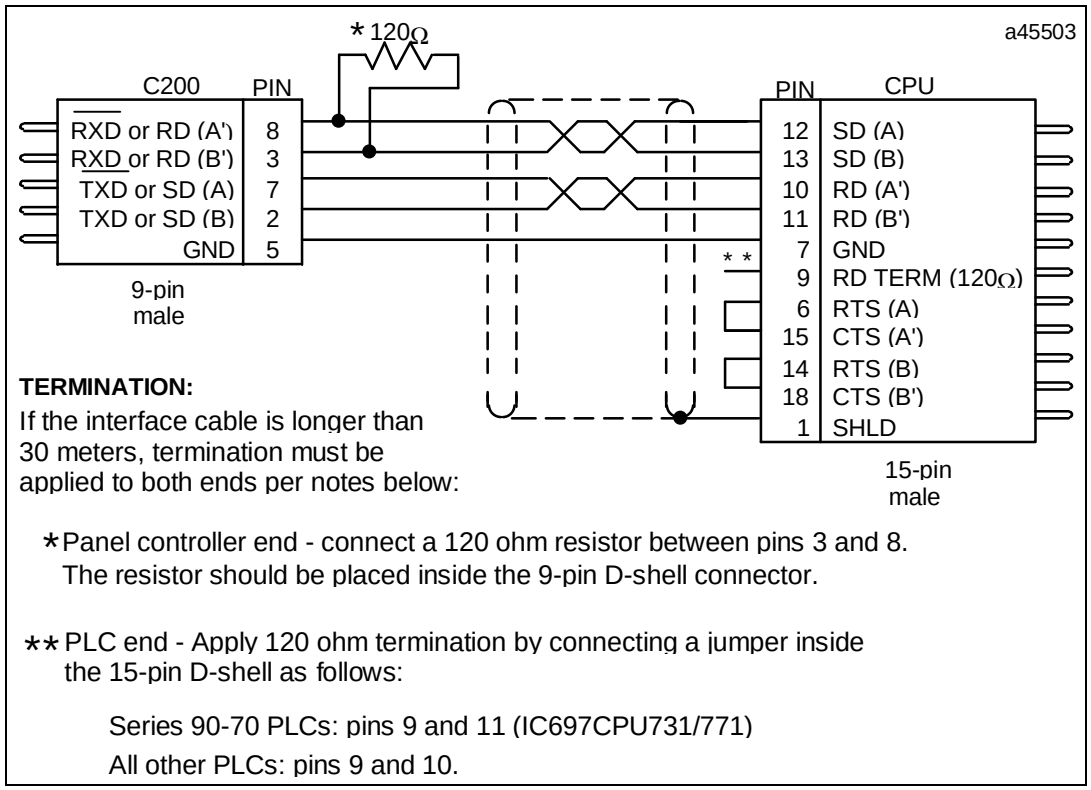


Figure A - 1. Point-to-point Cable Connections for C200 Controller to CPU Series 90 (RS-422)

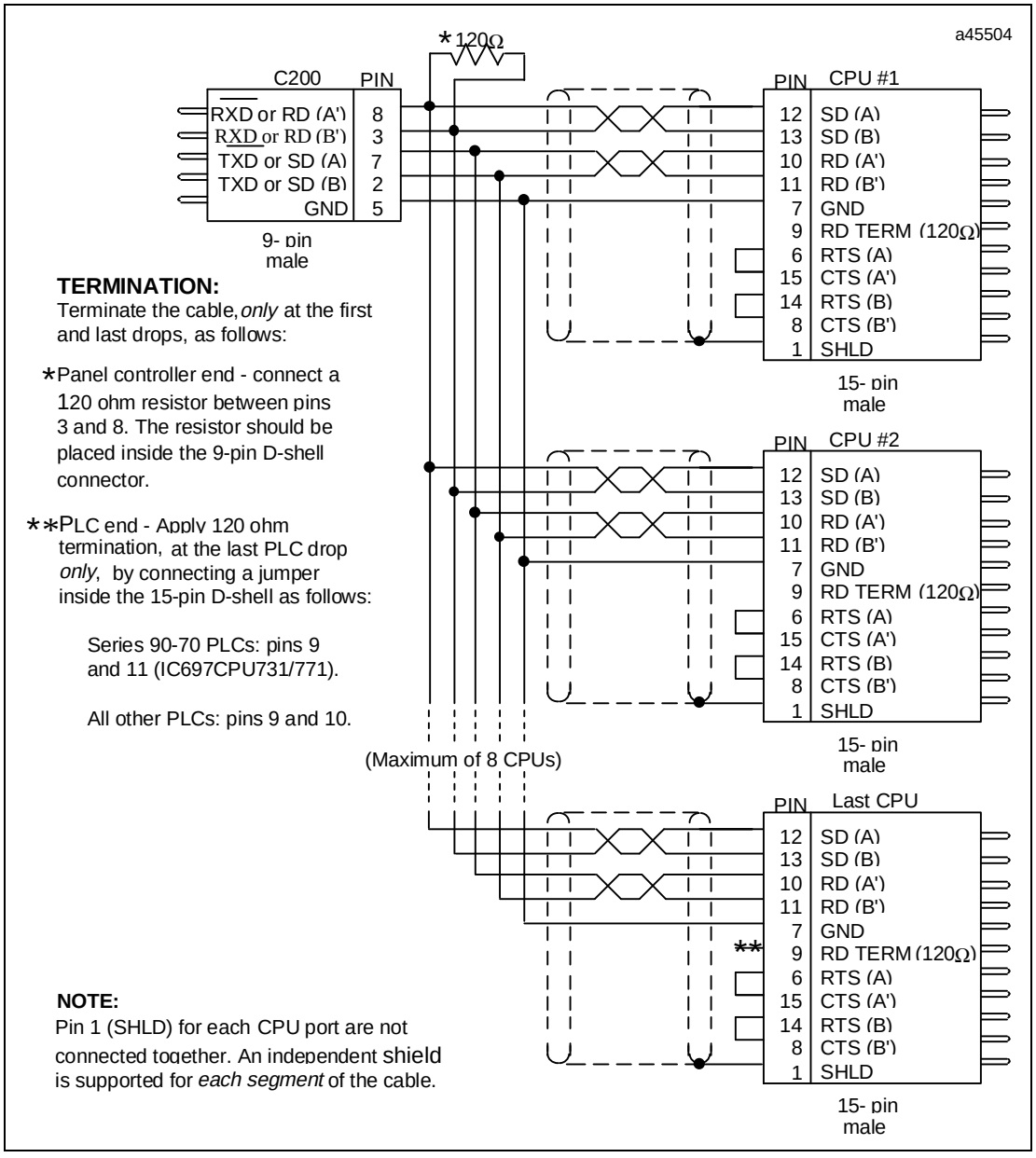

a45504
*120Ω
C200
PIN
RXD or RD (A')
RXD or RD (B')
TXD or SD (A)
TXD or SD (B)
GND
8
3
7
2
5
9- pin male
TERMINATION:
Terminate the cable, only at the first and last drops, as follows:
*Panel controller end - connect a 120 ohm resistor between pins 3 and 8. The resistor should be placed inside the 9-pin D-shell connector.
**PLC end - Apply 120 ohm termination, at the last PLC drop only, by connecting a jumper inside the 15-pin D-shell as follows:
Series 90-70 PLCs: pins 9 and 11 (IC697CPU731/771).
All other PLCs: pins 9 and 10.
NOTE:
Pin 1 (SHLD) for each CPU port are not connected together. An independent shield is supported for each segment of the cable.
PIN
CPU #1
12 SD (A)
13 SD (B)
10 RD (A')
11 RD (B')
7 GND
9 RD TERM (120Ω)
6 RTS (A)
15 CTS (A')
14 RTS (B)
8 CTS (B')
1 SHLD
15- pin male
CPU #2
(Maximum of 8 CPUs)
Last CPU
**
15- pin male

Figure A - 2. Four-wire Multidrop Cable Connections for C200 Controller to CPU Series 90 (RS-422)

PANELWARE Panel to CMM Module Series 90

Figures A-3 through A-5 illustrate the Panel connections to a CMM Module Series 90.

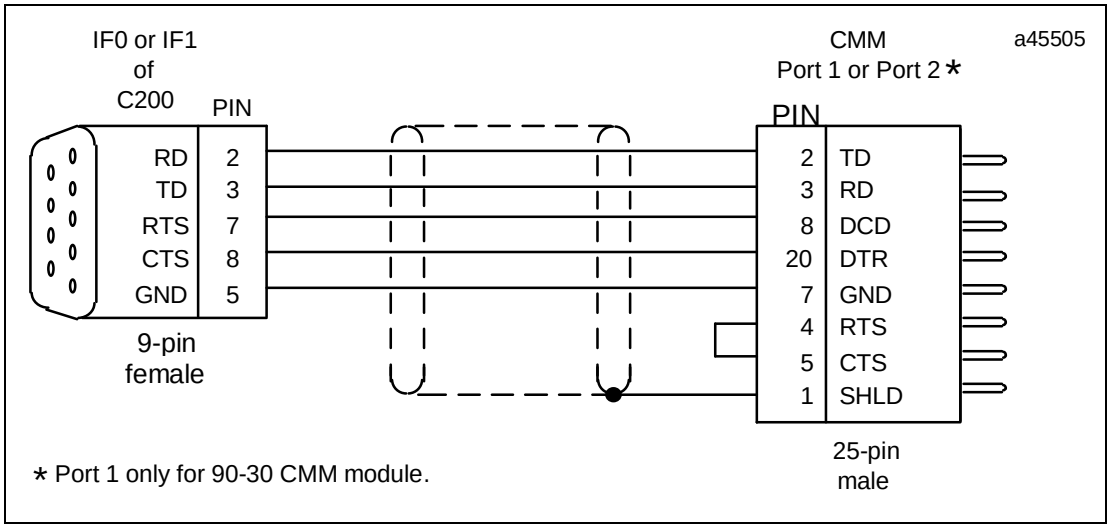
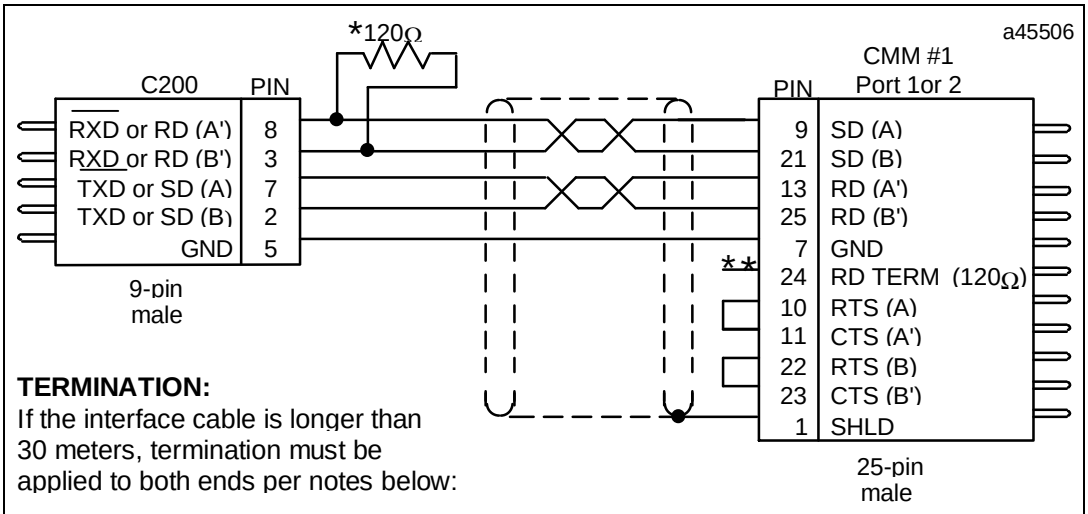


Figure A - 3. Point-to-point Cable Connections for C200 Controller to CMM Module Series 90 (RS-232)



TERMINATION:
If the interface cable is longer than 30 meters, termination must be applied to both ends per notes below:

* Panel controller end - connect a 120 ohm resistor between pins 3 and 8. The resistor should be placed inside the 9-pin D-shell connector.

** PLC end - Apply 120 ohm termination by connecting a jumper between pins 24 and 25. The jumper should be connected inside the 25-pin D-shell.

NOTE:
On the 90-30 CMM module (IC693CMM311), only port 2 can support RS-422/RS-485 communications.

Figure A - 4. Point-to-point Cable Connections for C200 Controller to CMM Module Series 90 (RS-422)

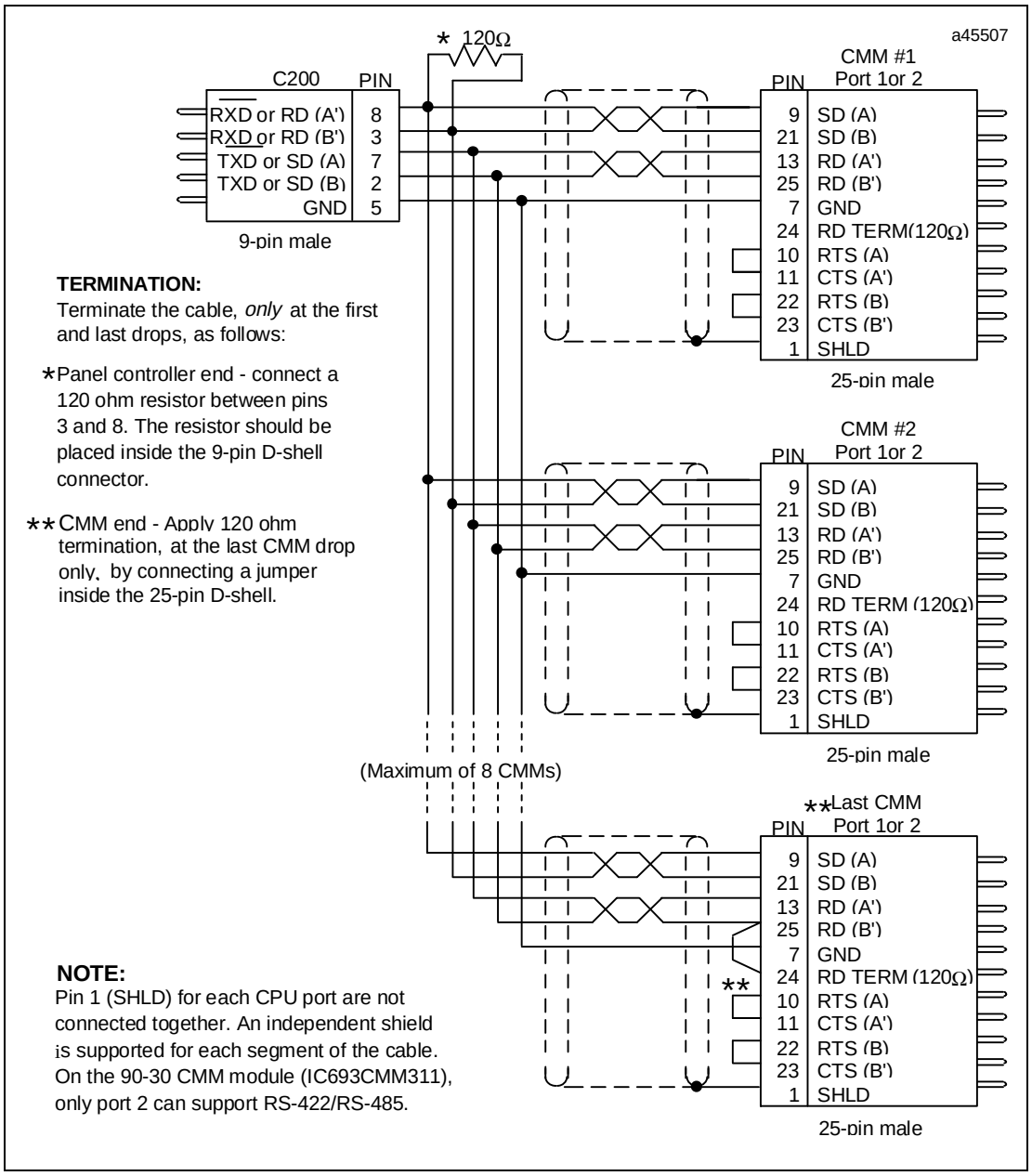
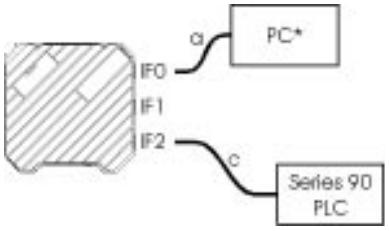
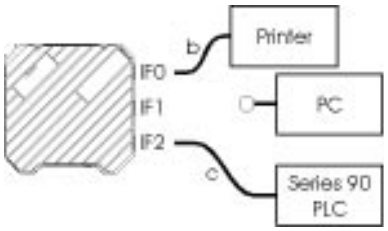
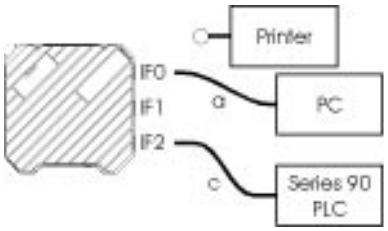


Figure A - 5. Four-wire Multidrop Cable Connections for C200 Controller to CMM Module Series 90 (RS-422)

Cabling Diagrams

The following table provides an overview of the cabling possibilities for connecting PANELWARE Panels, PLCs, printers, and PCs (with PCS installed and running).

Table A - 2. Cabling Diagrams for Various Configurations

Configuration	Run Mode	Teach Mode
C200 + Series 90 PLC (no printer)	 * The PC does not need to be connected in RUN mode.	
C200 + Series 90 PLC + printer on IF0		

The pin-out diagrams for the various cables are provided in the PANELWARE documentation as outlined below.

Table A - 3. Pin-out Diagram Locations in Documentation

Cable (see diagrams above	Manual and Chapter/Appendix
A (Panel to PC)	*PANELWARE Hardware Installation User's Manual (GFK-0848)* Appendix A Cabling Information (Connection to the PC)
B (Panel to printer)	*PANELWARE Hardware Installation User's Manual (GFK-0848)* Chapter 7 Printers
C (Panel to PLC)	Pages A-2 through A-6, this chapter.

Appendix

B

Errors/Troubleshooting

This appendix provides an overview of possible system errors, their causes, and how to handle them. Actual error messages are displayed, followed by possible causes and corrective actions. The following information is included:

- Errors During Installation..... B-2
- Errors During Program Start B-3
- Errors While Working in PCS B-4

Errors During Installation

Installation could not be ended properly!
Setup program cannot be called!

Check the following:

- The PC processor type must be an 80286 (12 MHz) or higher.
- At least 4 MB of memory must be free on the hard disk.
- Does the PC have enough free memory? PC must have at least 640 KB RAM (512 KB must be available). If not, remove the memory-resident programs.

Errors During Program Start

PCS cannot be started!

Make sure the following conditions are met:

- The PC must contain an 80286 or higher type processor.
- The PC must have at least 640 KB RAM (512 KB must be available). If enough RAM is not available, remove the necessary memory-resident programs.

PCS Error Message Fatal Error, PANELWARE requires 1 MB on drive c:

Check that the following condition is met:

- To start PCS, the PC must have at least 1 MB hard disk space available.

Errors While Working in PCS

When PCS is running, error messages are either displayed in the bottom line of the screen (the function key line) or in the current window.

Faults running PCS!

Check that the following condition is met:

- FILES and BUFFERS in the CONFIG.SYS file should be set to at least the following values:
  - BUFFERS = 10
    FILES = 40
  - During installation, the SETUP program makes these settings automatically, but only if you responded positively by pressing ***Y*** during the installation process. If the BUFFERS and FILES values in the CONFIG.SYS file are smaller, change them to the above values before trying to run PCS again.

Invalid Project Name

This error message appears in the last line if a new project is assigned a name that already exists. Either change the new project's name or delete the existing project that has the same name.

`<File name>` *cannot be written*

When entering project names or saving pictures, text groups, or key definitions, filenames must meet the following conditions:

- Maximum length of the filename: 8 characters
- Only standard MS-DOS characters are allowed. Characters such as **".*?,;.:"** or the space character are not permitted.

`<File name>` *cannot be read*

This error message appears if a non-existent filename is entered while trying to load a project or picture.

If no filename is entered and the ↵ (Enter) key is pressed, all existing project or picture names are listed in a selection window. By using the cursor keys to highlight a filename, the desired project/picture can be selected and loaded.

Error! Error picture and first picture cannot be the same!

The compilation of a project is interrupted by this error message if the error picture is defined in the first position of the picture directory. The start-up picture must be listed in the first position of the directory (see “Binding Pictures in a Project”).

Cannot make connection with panel!
Please check cable and installation!

After selecting the **Download** function from the **Utilities** menu, this message appears if the connection to the Panel cannot be made. Check that the following conditions are met:

- Is the PC connected to the Panel?
- Is the Panel properly supplied with power?
- Are all cables connected to the proper interfaces?
  - IF0 on the Panel
  - COM1 or COM2 on the PC, depending on PCS configuration (see the section entitled “PCS Configuration”).
- Is the Panel in *Teach Mode*?
- Is the download cable in good shape and properly connected?

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